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COTTON PRODUCTION IN CENTRAL AMERICA

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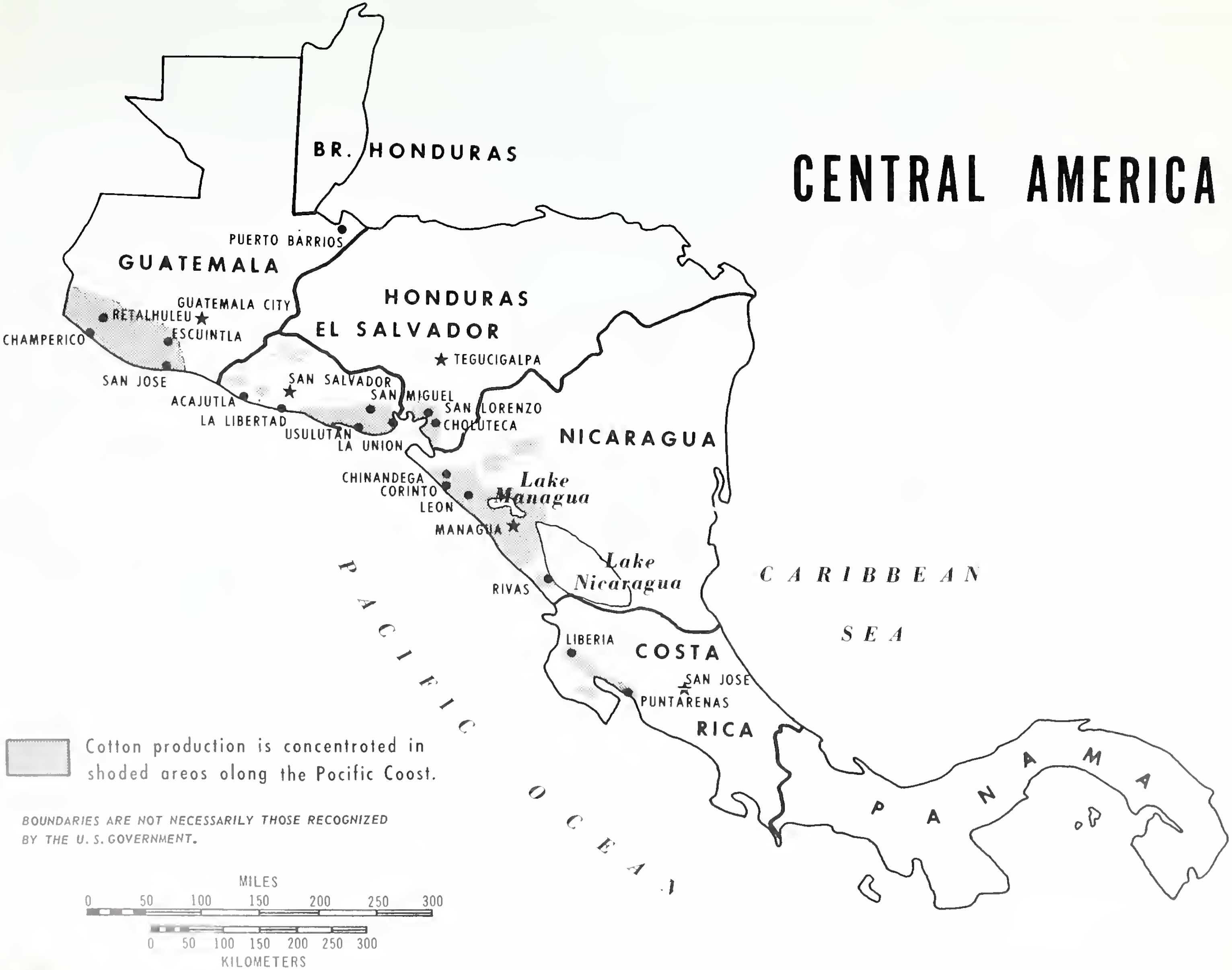
CENTRAL AMERICA



▨ Cotton production is concentrated in shaded areas along the Pacific Coast.

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U. S. DEPARTMENT OF AGRICULTURE

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FOREWORD

Cotton has played a dramatic role in the changing pattern of agricultural production and foreign trade in Central American countries during recent years. In the 1962-63 season, cotton production in Nicaragua, El Salvador, Guatemala, Honduras, and Costa Rica totaled over 900,000 bales, 16 times the output just 12 years earlier. Since less than 10 percent of the cotton produced in these countries is consumed locally, the commodity has quickly become one of the major export items, along with the traditional crops, coffee and bananas.

In the aggregate, the Central American area has rapidly become a major competitor in world cotton markets. Through the use of planting seed of improved American Upland varieties and effective adaptation of modern cultural methods to tropical conditions, per acre yields that are among the highest in the world for non-irrigated cotton are being achieved.

This study examines and reports on the extraordinary expansion in Central American cotton production during the past decade. In it, the natural, economic, and other pertinent factors that have stimulated such developments are analyzed, and the outlook for future years is appraised. As a part of the Foreign Agricultural Service program of reporting on and assessing the competitive aspects of agricultural developments in other countries, it is a most timely and valuable contribution.

R. C. Sherman
Director, Cotton Division

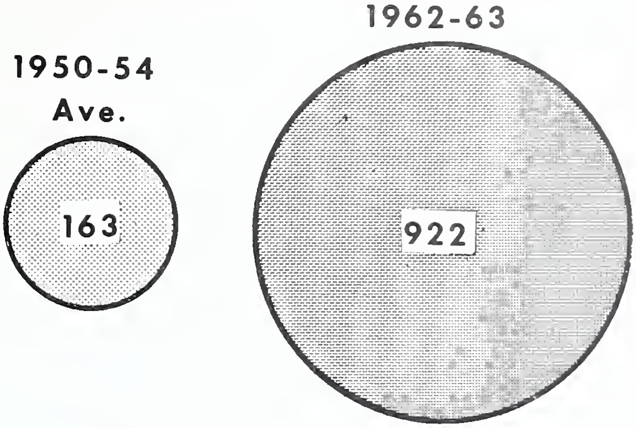
ACKNOWLEDGMENT

The author wishes to express appreciation to the many informed persons in Central America who so graciously cooperated in this study. This includes numerous officials of the governments, lending institutions, and cotton growers associations, as well as individual cotton growers. Quite a few business leaders connected with production services, ginning, marketing, and the cotton textile industries also provided extensive information which is gratefully acknowledged. Thanks are also extended to U.S. Agricultural Attaches Marshal D. Fox, Alvin E. Gilbert, and Dalton L. Wilson for their valuable assistance, and to the people in the United States and Central America who reviewed the manuscript and offered helpful suggestions.

COTTON CHANGES IN CENTRAL AMERICA✱

PRODUCTION△

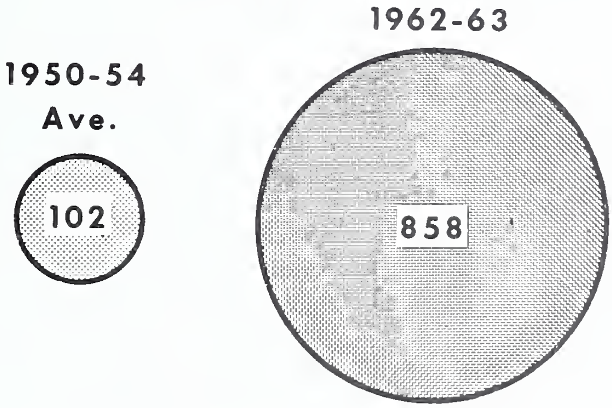
1950-54 Ave.	Thous. Bales
Nicaragua	87
El Salvador	53
Guatemala	20
Honduras	2
Costa Rica	1
TOTAL	163



1962-63	Thous. Bales
Nicaragua	325
El Salvador	320
Guatemala	250
Honduras	21
Costa Rica	6
TOTAL	922

EXPORTS△

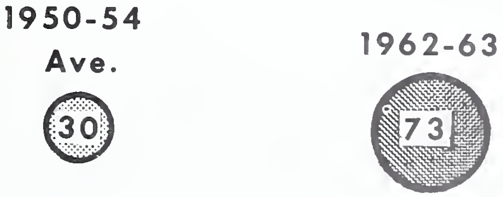
1950-54 Ave.	Thous. Bales
Nicaragua	62
El Salvador	31
Guatemala	9
Costa Rica	●
Honduras	●
TOTAL	102



1962-63	Thous. Bales
Nicaragua	315
El Salvador	300
Guatemala	221
Honduras	19
Costa Rica	3
TOTAL	858

CONSUMPTION△

1950-54 Ave.	Thous. Bales
El Salvador	13
Guatemala	11
Nicaragua	4
Costa Rica	1
Honduras	1
TOTAL	30



1962-63	Thous. Bales
El Salvador	30
Guatemala	30
Nicaragua	7
Costa Rica	4
Honduras	2
TOTAL	73

✱ *EXCLUDES BRITISH HONDURAS AND PANAMA WHICH DO NOT PRODUCE COTTON COMMERCIALLY.*

△ *ALL FIGURES ARE THOUSANDS OF 500 POUND GROSS WEIGHT BALES, AND DATES ARE SEASONS BEGINNING AUGUST 1.*

● *LESS THAN 500 BALES.*

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COTTON PRODUCTION IN CENTRAL AMERICA

By Joseph H. Stevenson
Cotton Division

SUMMARY AND CONCLUSIONS

Cotton production in the Central American countries is expected to continue to rise over the next several years, but at a slower rate than recently. Summation of predictions by cotton industry people in each of the 5 countries--Nicaragua, El Salvador, Guatemala, Honduras, and Costa Rica--indicates aggregate production in Central America[1] will reach about 1.5 million bales in the next few years compared with 922,000 bales in 1962-63 and only 56,000 bales just 12 years ago.[2] The stimulus comes from the favorable returns from cotton, as a result of attractive prices and high yields in relation to alternative crops. The larger cotton crops expected in future years will be primarily for export, as domestic consumption is small and is not expected to increase materially. This cotton will be in direct competition with U.S. Upland types in foreign import markets.

Economic factors, rather than natural conditions, will probably have the greatest influence on the extent of future production increases. These factors include such important considerations as variations in world supply and demand for cotton, and movements of raw cotton prices in international markets in relation to mounting costs of production in Central America. Also, availability of production credit probably will continue to have an important bearing on whether or not growers expand or contract a large cash input enterprise such as cotton or else switch to other undertakings. Labor, a major cost item, is exerting an increasing influence on cotton growing in Central America. Rising wage rates and some scarcity of skilled and seasonal-unskilled labor are already reported, as in Guatemala. As a result, production volume and cultural practices may have to be adjusted to the labor situation. For some time to come, many high-cash input items such as machinery and equipment, insecticides, and fertilizers will probably have to be imported.

Natural factors, on the other hand, seem to favor further cotton expansion despite certain drawbacks, such as the necessity for many insecticide applications. The best evidence of natural suitability is the fact that yields per acre are among the highest in the world. For example, especially suitable to cotton are the deep soils of volcanic origin, prevalent in so many parts of the Pacific Coastal Plains where cotton is grown, and the wet-season, dry-season climate in which cotton is planted and grown in the rainy months and then picked in the dry months.

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[1] Excludes Panama and British Honduras, which do not now produce cotton on a commercial scale.

[2] Bale weights quoted in this study are 480 pounds net unless otherwise specified.

NOTE: Information in this report is based in part on a trip to Central America by the author in February and March 1963.

Use of alternative enterprises is rather small at present because of the comparatively attractive returns from cotton. In 1962-63, alternatives such as the raising of cattle and sugarcane, and other enterprises, did not vie strongly for the land, labor, and capital going into cotton. Not to be overlooked in evaluating the present favorable returns from cotton are the relatively high yields per acre obtained under good weather conditions in the past two years. Over the longer pull adverse weather and/or insect damage could push the per unit costs higher.

Many leaders in these countries recognize that the risks of fluctuations in prices, costs, and yields for cotton in relation to substantial initial investments highlight the merit of the trend, though small at present, toward greater diversification of agricultural output, both for domestic and export use. Population increases of 3 percent or more a year, and generally low-calorie diet emphasize the need for larger food-crop production. As capital and technical know-how needed become available, and export markets are developed, a greater number of other climatically suited crops--such as tropical fruits and nuts--might be produced commercially, thereby lessening dependence on coffee, bananas, and cotton.

Most of the cotton production in Central America is on large commercial type farms, and many operations are done with machines. The main exception is picking, which is almost entirely by hand. Some cotton is grown on small farms using family labor and little, if any, mechanized equipment. Practically all cotton is raingrown in Central America, although irrigation is expected to increase in El Salvador and Nicaragua. All cotton is American Upland type, and new seed for planting part of the crop are imported each year from the United States. Use of commercial fertilizers such as 15-15-15 is becoming more common, particularly in the older producing areas and on the less fertile soils. Combatting insects is a major production activity and source of cost. Insecticide applications, chiefly from airplanes, may total as many as 35 or so during the season. The boll weevil is locally the major pest of cotton, but others such as false pink boll worm and aphids present difficulties. By comparison, diseases are a minor problem.

Among all the Central American countries, Guatemala probably has the greatest natural potential for expansion in cotton production. Cotton acreage has increased nearly 200 percent since 1959, claiming land formerly in bananas, pastures, and jungle. Nevertheless, additional plantings could increase production over the next 5 years or so to around 500,000 bales, compared with 250,000 in 1962-63, according to local industry estimates. Land is relatively scarce in El Salvador, the smallest of the Central American republics. However, the consensus is that sufficient potential exists there, including use of irrigation, for increasing production from 320,000 bales in 1962-63 to around 450,000 bales in the next few years.

In Nicaragua, traditionally the largest cotton producing nation in Central America, interest in cotton growing is increasing, and production may reach 450,000 bales later in the 1960's compared with 325,000 bales in 1962-63. Cotton production in Honduras, at 21,000 bales in 1962-63, could rise to about 75,000 in the next 3 years, but possibilities are limited, chiefly by the small suitable area. In Costa Rica, the suitable area is also small and growers help finance cotton until it is consumed by domestic mills or exported.

However, under official plans and proposed Japanese assistance, production may increase to 20,000 bales within 2 years, from the 6,000 bales grown in 1962-63.

NICARAGUA

Trends in Cotton Production

Agricultural commodities comprise close to two-fifths of the Gross National Product in Nicaragua, and around two-thirds of the working population are in agriculture. Sesame, sugar, rice, corn, beans, bananas, and beef are all produced on a major scale, but cotton and coffee account for close to three-fifths of Nicaragua's total foreign exchange earnings. For many years, coffee was the principal "cash" crop that moved into export. In recent years, however, with the sharp rise in cotton production, the value of cotton exports now surpasses that for coffee. Cottonseed ranks among the first five agricultural exports, even though it has only about one-sixth the value of cotton or coffee.

Cotton has been grown in Nicaragua for many years, but prior to 1950 less than 10,000 acres a year were used for this crop. In the early 1950's, cotton growing expanded rapidly under the stimulus of a combination of threatened world shortages, and rising prices stemming from the Korean War, and increasing world consumption. By 1955-56, cotton acreage totaled 257,000, over 35 times the 7,000 acres of only 7 years earlier. Yields increased from an average of around 260 pounds of lint per acre in the early 1950's to 504 pounds in 1953-54, and production rose from less than 50,000 to about 200,000 bales per year.

Heavy rain and insect damage cut the 1955-56 crop back to 160,000 bales. Prices in world import markets declined sharply in 1956-57, providing less incentive to plant cotton, and acreage dropped to 182,000. In a move to increase production, the government paid cotton growers a direct subsidy of $8.25 per acre in 1958-59, but this was subsequently discontinued. With adverse weather, mounting costs of combatting insects, and lower returns added to these factors, the crop was down to 128,000 bales in 1959-60, and the government encouraged farmers of lands with relatively low yields to grow crops other than cotton as part of a diversification program. As a result, acreage declined to 151,000 by 1960-61. The downward trend was reversed in 1961-62. Acreage and yields rose sharply in that year and again in 1962-63, and successive production records were set at 255,000 and 325,000 bales, respectively.

Cotton production is concentrated in the plains along the Pacific Coast. The cotton-growing region extends roughly from the city of Rivas on the south almost to the Gulf of Fonseca on the north, and inland to the cities of Somoto on the northeast and Boaco on the southeast. Most other regions of the country are not especially well suited to cotton growing, as the central region is mountainous and the eastern seaboard, or Caribbean littoral, is a typical rain forest region. The leading producing areas were formerly in the Department of Managua and those immediately to the south. In more recent years, Chinandega has taken the lead, accounting for 48 percent of the crop in 1961-62. That year, Leon was in second place with 33 percent and Managua third with 14 percent, while the remaining 5 percent was grown in Matagulpa, Masaya, Esteli, Carazo, Madriz, Rivas, Granada, and Boaco.

In some areas of the Departments of Chinandega and Leon, soils are volcanic in origin, fertile, and very deep, but quite fine and porous and are subject to leaching and to wind and water erosion. The same type of soil extends southward to Rivas, but it is generally not as deep. Soils between Managua and Granada have high clay content. Some of the land between Chinandega and Corinto is heavy and stays wet too long in the rainy season to permit satisfactory cultivation of cotton.

Climatic conditions are favorable to many aspects of cotton growing. Temperatures range from 60° to 95° F. with an average of around 80°, and rainfall totals about 65 inches a year. In the rainy season that starts in late April there are short, heavy tropical showers daily. Rainfall is lighter in July and August when planting takes place, and the light, porous soils can be worked within a short time after a rain. During the hot, dry season from December to late April, weather is usually excellent for maturing and harvesting the crop. However, dust, high winds, and infrequent but heavy showers at this time of year sometimes damage the cotton, especially seed cotton piled in great mounds on the gin yards.

Production Practices

All the cotton grown in Nicaragua is the American Upland type. The principal kinds now planted are Deltapine, Stoneville, Delfos, and Acala. This is in contrast with the situation in 1955-56, for example, when nearly all the acreage was in Delfos, and Coker 100 Wilt was about the only other variety grown. Fiber length varies from about 1-1/32 to 1-1/8 inches, micronaire ranges from about 3.5 to 4.5, and fiber strength (Pressley) from about 65,000 to 78,000 pounds per square inch. The Instituto Nacional de Comercio Interior y Exterior (INCEI) reported that of the more than 300,000 bales classed from the 1962-63 crop, 93 percent ranged from Middling to Strict Low Middling Light Gray, 1 percent was above Middling, and 6 percent was designated as Low Middling or below.

Some new planting seed are imported from the United States each year, and some seed are saved from the local crop for planting. A few farmers reportedly are growing seed for planting purposes, getting it certified by the government, and selling it as certified seed. There seems to be increasing interest in growing varieties with higher fiber strength.

Insects attack the crop each year in great numbers, and coping with them is an intensive, high-cost operation. There are no freezing temperatures between seasons to kill "hibernating" insects, and warm and humid periods during plant growth and fruiting favor insect development. Also, frequent heavy showers wash off insecticides and make frequent application necessary. However, the fact that insects have been controlled with a reasonable degree of success has been one of the principal reasons why cotton can be

Excellent stand of American Upland cotton ready to pick in fertile area near Chinandega, Nicaragua. Central American yields are among the world's highest for rain-grown cotton.

grown profitably in Nicaragua. Principal cotton pests include the boll weevil, false pink boll worm, leaf worm, and aphids which secrete honeydew. Although some diseases such as root rot, leaf spot, and wilt are encountered, diseases as a whole do not seem to be as much of a problem as insects.

Insect control is accomplished chiefly by spraying liquid insecticides from airplanes. Growers with small acreage apply spray by use of a tank carried on a man's back, or hire spraying done by airplane. Growers in the Managua area, with about 75 acres each, use tractors with spray equipment attached, for early application, then later when plants are tall and foliage is thick, airplanes are used. One "cooperativa" (producer association) has 20 airplanes, pilots, and ground crews, and all members use these facilities in controlling insects. The number of spray applications in a season averages about 20, but may total 30, depending on the extent of infestation, frequency of rains, and grower's preferences. Most growers prefer to spray on a regularly scheduled basis, but some rely on the insect count method. In an effort to control insect hibernation and damage the following year, growers clear away cotton stalks following harvest, then plow the soil in compliance with the laws requiring this. On many farms, the stalks are burned as soon as harvest is completed. The plowing subjects the soils to wind and water erosion, but in recent years this problem has been partly overcome by the use of more conservation practices such as contour plowing and use of cover crops.

Use of machinery is not confined to the airplane spraying process. Most other production operations are performed by machines, especially on the large plantations, which account for most of the cotton production. A major exception is harvesting, which is all by hand although one or two picking machines are now on trial. Although some weeding is done with machetes or cumas (a special knife), most of the weeding and all thinning is done by hand. Where machines are impractical, cultivation is handled by animal-drawn implements. Power requirements are provided almost entirely by tractors, and many more tractors are used than in former years as a result of good returns from recent cotton crops. Heavy-duty-type tractors and machinery are being used to clear new land quickly for cultivation. Most farm transportation, such as the hauling of seed cotton from farm to gin, is by truck.

Application of commercial fertilizers has become increasingly widespread in the past several years, but is believed to be far from extensive, although actual statistics are not available. The original fertility on cleared lands diminishes after planting takes place year after year. The volcanic soils, although rich and deep, are porous and subject to leaching, and fertilizers are needed in the less fertile areas, including some regions brought into cotton production in the past few years. Growers applying fertilizers in the Managua area, where topsoil is thinner, use an estimated 300 to 600 pounds per manzana (1.73 acres) of a fertilizer such as 10-30-10 plus urea. The average, where used in Leon, is about 250 to 350 pounds per acre, while growers in the more fertile Chinandega area use only about 175 to 250 pounds of fertilizer per acre.

Cotton acreage is not irrigated in Nicaragua. There have been seasons when irrigation probably would have been beneficial to plant growth and development and increased yields. Irrigation also opens up the possibility of raising two crops in one season. A move toward irrigation is underway in the form of the Rivas irrigation project sponsored by the National Development Institute (INFONAC), an autonomous government agency. Current expectations are that the first areas out of the eventual total of about 20,000 acres, comprising more than 500 farms to be provided with water, will be irrigated by mid-1964. It is expected that most of the new irrigated acreage will be in bananas, rice, and other food crops, and that the cotton acreage to be irrigated will be small, at least in the near future.

Financing

Most Nicaraguan growers borrow money to finance cotton production. The National Bank finances the growing of an estimated 55 percent of the total crop, while that of the remainder is financed chiefly by insecticide companies, two private banks, and the growers themselves. In some instances, exporters advance some funds late in the season to help growers pay harvesting costs. Growers obtain loans from the National Bank to purchase machinery and to pay for land rent, land preparation, planting seed, and other costs continuing through the harvest. The Bank currently provides for loans to the more efficient growers up to about $125.00 per acre which covers over 90 percent of estimated costs. The amount of the loan is fixed when made, and additional amounts are not advanced later in the season. The amount of individual loans is usually based on the expenses necessary to cover 25 sprayings during the season. The Bank's interest rate is 6 percent per annum, plus 1 percent service charge to help cover cost of technicians who make field inspections and make suggestions to growers for improvement.

Land Tenure and Farm Labor

The number of growers in Nicaragua applying for licenses to plant cotton has increased from 1,857 in 1958-59, to an estimated 3,475 in 1962-63, and is expected to increase still further in 1963-64. Only a few of the cotton growers reportedly are non-Nicaraguans. Most cotton production is on large plantations, although there are also many small land holders. Much of the land is owner-operated, but owners frequently hire farm managers or "administrators." An estimated 35 percent of the growers in the country cash-rent the land on which they produce cotton. The renter-grower in some cases is a professional man who lives in the city and hires labor to operate the farm. This practice is most prevalent in the Managua area, and is done chiefly in years when chances of returns from cotton growing appear to be especially attractive. Share-cropping is not practiced.

The supply of farm labor is not always plentiful throughout the season, and a few growers feel more picking hands could be used in certain localities when harvest is heaviest. Labor in general is rather inefficient, and more trained people are needed. However, at present there seem to be no real labor problems that could be considered serious limitations in future expansion of cotton production.

Alternative Crops

Many people feel that with the good returns obtained from cotton in Nicaragua in the last 2 years, there are at present no crops closely competitive with cotton. In years when returns from cotton are relatively low, corn is probably cotton's closest competitor, and some growers indicate sesame, rice, and kenaf are good alternative crops. Private experiments are being conducted on sesame to improve yields. The market for kenaf, as well as other crops, would need to be developed before production could be expanded. Rice is getting some attention now as a cash crop, and may prove attractive. Some wet, heavy soils in the Chinandega area might prove well suited to rice, if drained properly.

Bananas reportedly are bringing good returns now, and some former cotton lands have been put into this crop. For example, around 1,200 acres of high-yielding Chinandega cotton land have recently been converted to irrigated banana production. Interest is being rekindled among former banana growers. Plantain, a larger, less sweet, and starchier fruit than the ordinary banana, reportedly requires relatively little care, and gives much surer returns. As a result, growers are not likely to shift from its production to cotton. Cotton has to compete for harvest labor with such crops as coffee, sugar, sesame, and rice.

Cost of Production

Estimates presented here concerning costs of production were obtained on an informal basis from various sources in the cotton industry. Therefore the figures should not be considered as rigid guides for comparing costs of producing other crops within the country, or producing cotton in other countries. That would call for detailed analysis of costs and returns for cotton and for alternative crops, together with an evaluation of maximum resource utilization between areas, size of farms, and the like, together with assessment of the effects of alternative uses of capital, labor, management, and land.

Generally, costs of cotton production have tended to rise in recent years with the more extensive use of farm machinery, insecticides, airplanes, and modern gins. Most all of these must be imported. Also, land rents have increased with demand. Wage rates have risen, as well, but are still quite low compared with those in the United States.

For Nicaragua as a whole, costs of land rent, land preparation, seed, and other costs, continuing through the harvesting operation, are placed at about 1,600 cordobas per manzana ($132.00 per acre) in 1962-63 by local sources. Insecticides and their application comprise about 45 percent of the costs, harvesting 20 percent, land rents 12 percent, and other costs 23 percent. Land rents in 1962-63 averaged about $15 per acre in the Managua area, $17 in Leon, and $20 in Chinandega. However, demand for land has increased following the good returns from cotton in 1961-62 and 1962-63, and rents are up to $20 to $30 an acre in 1963-64. Also, there is a new land tax, and it is higher on land near roads or water. Wages for picking cotton range from about $1.00 to $1.40 per hundred pounds, including food for the pickers. Truck transportation is relatively cheap. Hauling of seed cotton can be secured for 15 cents per hundred pounds for a haul of as much as 20 or 25 miles.

Costs should be assessed against the value of the cottonseed produced as well as the lint. Thus, sale of cottonseed covers at least part of the charges for ginning and/or other costs. About 60 percent of the cottonseed moves into export channels, and the other 40 percent is crushed by the 3 domestic oil mills.

Costs vary widely from area to area and from farm to farm, depending on type of operations used. Of course, yields play an important role in assessing costs. Thus, more intensive cultivation normally would give higher yields, but total costs would also increase. Yet at high national average yields obtained per acre, of 662 pounds in 1961-62 and over 700 pounds in 1962-63, the consensus by growers was that practically all of them realized attractive profits. Should cotton prices dip significantly, a cost-price squeeze could develop, particularly for the less efficient growers. Costs of imported equipment, fertilizers, and insecticides continue to increase. With further acreage and production gains in view for next season, the demand for various goods and services may well push costs even higher unless supplies can be increased accordingly. Therefore, rising costs unaccompanied by the stability afforded U.S. growers by a price support program would no doubt slow rises in production and could cause a decline.

Harvesting and Ginning

Harvesting of cotton is performed almost entirely by hand. The cotton plants grow tall and foliage is thick so that picking is rather slow and difficult. Some fields are picked 3 or 4 times. There was reportedly only one mechanical picker in use in Nicaragua in 1962-63, and it was being used principally on a trial basis on the last picking only, with the first ones done by hand. Several years ago quite a few mechanical pickers were brought into the country, but they did not prove generally acceptable and were later reexported. Some points mentioned by industry sources in favor of hand-picking methods are: grades of cotton are higher when it is hand-picked, more people are provided with employment by hand-picking, hand-picking costs are relatively low, investments in mechanical harvesters are quite large, and harvester maintenance is expensive. However, on the opposite side, some growers contend that labor is no longer plentiful throughout the season and that more use of machine pickers might develop in the future.

Gins are privately owned and do custom ginning. The cooperatives have never owned gins but have arranged for ginning for their members. The cooperative in Leon plans installation of its own gin for the 1963-64 season. The 28 gins in Nicaragua have an average of about 4 stands each; a few have either 5 stands or 3. There is some question as to whether ginning facilities are adequate in light of the substantial increases in size of the crop, especially in the last 2 years. Four more gins may be in operation in 1963-64.

When harvest begins in volume, most of the gins operate on a round-the-clock schedule, stopping only long enough to service the equipment. Theoretically, a crop of 325,000 bales could be ginned in about 95 days with present facilities, assuming a 20-hour operational day and 6 bales per hour per gin. Actually, however, the ginning season is much longer because of the location of gins, the rate of harvest, and the movement to gins. Ginning usually begins in late November and is nearly completed by late April when the rains begin. Seed cotton kept in storage houses may be ginned after the rainy season starts and in a few instances ginning is not completed until around June. At the height of the harvest season, seed cotton is hauled to gins much faster than it can be ginned, and it is common practice to store seed cotton in huge wire bins with no roof. Showers do minor damage to such cotton, but they are usually infrequent during the ginning season.

Cotton is planted later in the Chinandega area than in others, so that earlier maturing varieties might help toward more efficient utilization of gin capacity. Gins are sometimes moved from one location to another to meet the needs of production shifts between areas. For example, a year or so ago, one firm moved a 5-stand gin from Granada, where production has declined, to the Chinandega area, and another gin was recently moved from Managua to the Rivas area in anticipation of increased production in Rivas.

Although an attempt is usually made to sell and ship the cotton as rapidly as possible to obtain needed funds, to cut down risks from price fluctuations, and to avoid possible weather and fire damage, quite large quantities of cotton can accumulate on gin yards in the busy season. Fire is a serious hazard to cotton stored in the gin area, especially in the dry season, but precautionary measures have kept fire losses low.

All ginning machinery and equipment is of U.S. manufacture. Most gins have dryers, precleaning and lint-cleaning equipment, and standard density bale presses. Bales are usually covered with a light-weight jute bagging, although cotton bagging is used on a small proportion. Tare weight ranges from 9 to 12 pounds. Average net bale weights ranged from 477 pounds in 1959-60 to 499 pounds in 1961-62. Bales are ordinarily sampled only once before export or delivery to local mills. The sample is divided into two parts; one is sent to the national classing office and the other is given to the grower. The charge for ginning cotton, which is assessed on the basis of lint weight, ranges from about $11.50 to $13.00 per bale. This compares with an average of $17.08 per bale in the United States in 1962-63. The average ginning outturn is about 34 percent lint.

Marketing

The flow of cotton from the grower through marketing channels in Nicaragua is varied. Growers dispose of their cotton about as follows: 50 percent direct to exporters; 30 percent to ginners; 12 percent through grower "cooperativas" to foreign importers; 7 percent through "cooperativas" to local exporters; and 1 percent to INCEI.

One-half or more of the cotton is sold by growers before it is ginned. This could reflect the keen competition among buyers. Also, some growers like to obtain their money from the cotton as early as possible to pay production expenses. However, the practice seems to be waning, as increasing numbers of growers apparently feel they get a better price when the cotton is sold as lint.

Exporting firms play a prominent part in the marketing process in Nicaragua. Over 95 percent of the crop is exported, and most of the cotton moving to overseas markets is handled by exporters, rather than being sold direct to foreign importers. A few years ago, there were about 12 exporting firms operating in Nicaragua, but this number has now increased to 21 and competition is keen. The exporters buy direct from growers, gins, cooperatives, and the INCEI. Cotton bought by ginners from growers is usually sold to exporters. Exporters buy on f.o.b. terms, with delivery on either gin or warehouse receipt. Delivery costs from gins to shipside are 86 points. There is no export tax on cotton in Nicaragua, but 3 percent of the value of the cotton, when exported, is retained by the income tax office. The industry is attempting to get this tax reduced.

There are 3 cotton cooperativas (producer organizations) in Nicaragua: 1 in Managua, 1 in Leon, and 1 in Ciudad Dario. Two handled about 25,000 bales each and the third about 5,000 bales, out of the total Nicaraguan crop of 325,000 bales in 1962-63. The cooperative in Managua has 146 members who sell their cotton through the organization, usually to exporters. However, members are not required to market through the organization. The cooperative takes an option on the growers' cotton rather than buying it outright. In addition to marketing, the cooperative imports and sells planting seed, fertilizers, and insecticides, and arranges for plane-spraying service for members. The cooperative in Leon, in operation for 3 seasons, has 82 members, and is expanding in both membership and volume. A charge of 1 percent is made for marketing members' cotton, but part may be refunded, depending on costs.

Use of machines is common in cotton production and marketing in Nicaragua. Here, bales are being loaded by fork lift to a truck to be hauled to the port of Corinto for export.

The INCEI, a government agency, enters the cotton market only when its officials feel that domestic prices are falling below world prices. Theoretically, this is intended as a measure of price assistance to growers and a means of setting price guidelines for exporters. If the INCEI finds it necessary to enter the market, the organization seeks an option on cotton from growers, and if this is obtained, INCEI proceeds to sell the cotton to foreign importers or the local textile industry without delay. It does not store or hold cotton, or attempt to speculate. After the sale, INCEI settles with the grower, deducting charges for tax stamps, insurance, loading, hauling from gin or warehouse to port, unloading, etc., as well as INCEI costs incurred in making the sales. INCEI handled about 8, 3, and 1 percent of the crops in 1960-61, 1961-62, and 1962-63, respectively.

INCEI requires that a sample of each bale produced in the country, whether handled by it or not, be sent to the INCEI classing office in Managua where 3 classers appraise the quality according to the United States Standards for Upland cotton. The quality information is made available to each grower. However, the grower sometimes has another sample cut at the gin and trades on this one. Most exporters sell on types. Reportedly, a government fiber-testing laboratory was installed in Managua some time ago, but has been used very little. Seed cotton is sometimes classed in 3 or 4 categories, but for the most part it is sold on the basis of average quality.

Transportation facilities have been improved considerably in recent years, although development of secondary roads has lagged. Nicaragua's 240 miles of Pan American Highway, and the roads from Managua to Leon and Chinandega, are nearly all hard surfaced and in relatively good condition. The road from Chinandega out to the port of Corinto is excellent, and the port is linked with the principal cotton-growing districts. Storage, loading, and dock facilities have been substantially improved recently in Corinto, a deep water port, and 5 ocean-going vessels can now dock there at the same time. A larger volume of cotton exports now move out of Corinto than from San Juan del Sur, where loading is by lighter. Railroad transportation is available from Managua to Corinto, but trucks are now the principal means of hauling seed cotton to gins as well as bales to market. Truck transportation reportedly can be obtained at relatively low rates.

Nicaragua's cotton is exported chiefly to Japan and Western Europe. In the 5 seasons prior to 1962-63, an average of slightly more than one-third of the cotton was exported to Japan, one-fifth to West Germany, over one-tenth each to the Netherlands and the United Kingdom, and most of the remainder to France, Belgium, Portugal, and Canada.

Consumption

The consumption of raw cotton in Nicaragua, currently at 7,000 bales, has accounted for 5 percent or less of annual production during the past 10 years. There are 2 cotton textile mills in Nicaragua that spin, weave, and finish. Two other relatively small mills do knitting only, buying cotton and rayon yarn from other sources, mostly in the United States. Since the spinning industry is small, attempting production of a wide range of styles and colors of products is not considered practical, and size of operations probably limits efficiency. Labor is plentiful and cheap, but is limited in technical know-how and efficiency. The second generation of mill workers is now becoming of working age and mill owners say these workers' knowledge and ability are notably higher. Much of the existing equipment is old and outdated, but some of it is being replaced and the plants are gradually being modernized. One mill has such a program underway with a view to making larger quantities of goods that will compete more effectively on the local market with imports.

Outlook

Acreage in 1963-64 in Nicaragua is currently expected to be about 15 percent above the 220,000 acres for 1962-63 and more than 60 percent above the 151,000 acres in 1960-61, just 3 years earlier. Yields were quite high in 1961-62 and 1962-63, and prices were relatively high and stable, thus inviting further expansion in 1963-64. New lands are being cleared in Chinandega and Leon, while in Managua, Granada, and Masaya, the increase will be in land that has been idle or used for other purposes, mainly pasture. Production in 1963-64 may not increase in proportion to the acreage, unless yields are maintained at the high level of around 700 pounds per acre.

Over the longer term, production of around 450,000 bales may be in prospect in Nicaragua, according to local industry estimates. The size of per-acre lint yields is likely to play an important role in the course of Nicaragua's future cotton production. The wet and dry season conditions generally favor cotton growing, but in some years such as 1955-56 and 1959-60 unfavorable weather was responsible for sharply lower yields. In the tropical zone, insects are an unpredictable threat and probably will continue to constitute a major factor influencing yields, and, in turn, total production. It is difficult to picture further yield increases when one sees the rich soils on which much of Nicaragua's cotton is produced, and the heavily fruited plants 6 feet and taller obtained without irrigation. Yet yields may mount even further in years to come with use of better-adapted varieties, and improvements in fertilizing, spacing, weed control, and other cultural practices. Experiments on the possibility of raising 2 crops a year from the same plants are being conducted in different areas. Under this practice, the plants would be topped back to 10 to 12 inches in height after the first crop is harvested, and a second crop obtained from second growth in the same year or season. However, some unforeseen problems, including insect attacks, could negate this practice.

Economic factors, such as the level of cotton prices in international markets and costs of production, will also have a bearing on the future of cotton production. Should prices drop to a substantially lower level for an extended period, many cotton growers may find their costs excessively high in relation to returns, and turn to other, more attractive, enterprises. Labor shortages anticipated early in the 1962-63 season did not prove to be widespread, but production practices in the years ahead may well have to be changed to match the availability of labor. This is especially true for the harvesting operation, and the already-evident need for skilled persons in various operations, especially at the middle-management level.

Interest in cotton growing is spreading to various potential producing areas of Nicaragua such as Granada and Rivas. Some additional lands in the Chinandega and Leon areas can be put into cotton. In the next few years, production probably will push up north of Chinandega toward Somotillo as new roads make the area more accessible. Around Somotillo, some land planted in sesame, now a popular crop, will probably go into cotton. However, because of more rainfall and heavier soils than in many of the other cotton areas of Chinandega, part of the Somotillo area is perhaps better suited to cattle or other enterprises than to cotton. A $2.6 million loan has been obtained from the World Bank for a large-scale irrigation project in the Department of Rivas. Irrigated acreage may be brought into cotton production there for the first time in 1964. The expanded irrigation program contemplated for Rivas could well influence future cotton production, whether the irrigated land is put into cotton or is used for food or other crops, thus releasing nonirrigated lands to cotton.

The interest in further expansion of cotton production carries a certain note of caution in recollection by growers of the land-rush type operations of 4 or 5 years ago that proved uneconomical for many. The risk of expansion appears to be more of a calculated one now, and some growers are not eager to go into what they feel will be less productive uses with possible higher costs. As to the government's role in future cotton production, it seems unlikely that in case of a price decline the government would be able to give significant enough financial assistance to the industry to maintain production at an uneconomical level.

EL SALVADOR

Trends in Cotton Production

El Salvador is the smallest, most densely populated, and most industrialized of the Central American countries, yet nine-tenths of its foreign exchange earnings come from farm commodities. Coffee is still the chief cash crop by a large margin. Since 1950, cotton has replaced sugar as the second most important export crop, in recent years accounting for about one-fifth of the value of all exports.

Cotton is not a new crop in El Salvador, but before 1950, 30,000 bales or less were grown on less than 40,000 acres. Acreage and yields both increased substantially in the 1950's. Production more than doubled from the 150,000-bale-average for 1955-59 to 320,000 bales in 1962-63. The increase reflected the expansion in area--from 107,000 to 220,000 acres. Yields declined from the 1955-59 average of 682 pounds per acre to 651 pounds in 1961-62, then rose to 698 pounds in 1962-63.

The main producing region is between the towns of Zacatecoluca and La Union on the Pacific coastal plain, and around Acajutla. The Department of Usulutan now accounts for 30 percent of cotton production compared with 40 percent 10 years ago, and La Paz 18 percent of the crop, down from 27 percent in 1952-53. In contrast, greater diversion of pasture and cropland to cotton has increased the percentage from 19 to 22 in San Miguel Department, and from 4 to 14 in La Union Department. Alluvial soils have been deposited in the Pacific lowlands, but some areas are marshy and need drainage. Annual lowland temperatures range from about 70 to 110 degrees Fahrenheit, and rainfall averages about 70 to 75 inches a year.

Production Practices

The cotton cooperative now has nearly 5,000 members, compared with only 1,983 in 1950-51 and 1,036 in 1945-46. However, it is estimated that only about 60 percent of the present membership are actually growing cotton. Much of the cotton is produced on large farms on which machinery is used in most operations except harvesting, which is all done by hand. Cotton farmers used 965 wheel tractors and 428 caterpillar tractors in 1960-61. However, small operations of less than 10 acres apiece are not uncommon. For this, farmers use oxen for power, cultivate by hand with machetes or cumas (special knives), and use family labor for picking. Thinning and cutting grass and weeds is ordinarily done 2 or 3 times a year, usually by use of cumas. About 40 percent of the cotton acreage is owner-operated, and 60 percent is farmed by renters.

The principal varieties are Deltapine Smooth Leaf, Deltapine 15, and Acala 1517. Some new planting seeds are imported each year from the United States by the cooperative and that organization arranges for seed fumigation, multiplication, and distribution to farmers. There is some interest in trying other varieties, and in improving overall quality of fiber. The cooperative, the Ministry of Agriculture, and the Food and Agriculture Organization of the United Nations (FAO) are carrying out experimental work in such activities as variety improvement, insect control, and fertilizer application. However, in El Salvador and the other Central American countries, production practices seem to reflect largely research results from other cotton producing areas of the world, especially the United States, while research under local conditions has thus far not been extensive.

The use of fertilizers varies between sections of the country, but in general the application of fertilizers, with such compositions as 13-13-20 and 10-10-20 and ammonium sulfate, have become more widespread and effective as evidenced by higher yields per acre compared with 10 years ago and earlier. The "Amigos de la Tierra" organization of all kinds of Salvadoran farmers has done much to improve conservation practices, and has gained a voice in agricultural affairs.

Combatting insects is a major production activity and source of cost. Some of the principal pests are boll weevil, bollworm, leaf worm, spider mites, cotton stainers, white fly, and aphids. Most insecticides are applied from airplanes, but ground spray machinery or a tank on a man's back is frequently used on the small plots. Frequency of spraying is usually about every 5 to 10 days from August through November, then less frequently through mid-February. Total sprayings average about 20 per season but may go as high as 35 or 40. Spraying services can be hired by the grower, mainly from the cooperative. Charges vary according to size and nature of the area. The cooperative charges 10 cents a gallon where aerial application is relatively easy and 16 cents where it is more difficult.

The use of irrigation on cotton is quite limited, probably on 5,000 acres or less at present. Some dry season irrigation, mainly on pastures, has been practiced for many years on a limited scale. The government is studying irrigation projects for the Lempa and San Miguel Rivers, that would eventually encompass 50,000 acres or more. Also, underground water for irrigation may be sufficient in the coastal plains. There is some thinking that the use of irrigation might make it possible to grow 2 crops a year, especially of cereals and other food crops, thus cutting import requirements as well as releasing nonirrigated land for cotton. Some of the new irrigated areas probably would be used for cotton, and yields thereon might be 30 percent or more above that of dry land area, according to some private irrigation trials.

Financing

Most growers use some credit to produce their cotton crop. Loans from banks, some private, are generally used to pay land rent, labor, and administrative expenses, while loans from the cooperative are used to finance such costs as purchase of seed, fertilizers, and spraying. Stated interest rates are about 6 to 9 percent per annum. The cooperative obtains money to lend to growers from the government's Central Reserve Bank and U.S. banks. A new crop production credit program for small growers of cotton and other crops became available for the first time this year. The credit situation is tighter in some years than in others, depending on the influence of economic, political, and other factors, and credit has a direct bearing on the extensiveness of cotton cultivation, especially to the marginal producer.

The Cotton Cooperative

Very prominent in the whole scheme of cotton production and marketing in El Salvador is the cotton cooperative, Cooperativa Algodonera Salvadoreno, established in 1940 and closely regulated by the government. It is a producer organization to which all cotton growers must belong by law, and anyone planting cotton who is not a member is subject to heavy fine. Essentially the cooperative, which differs from the farmer cooperatives in the United States, is an industry-wide organization. It not only provides growers with various production services, including loans, but also owns all gins and controls all ginning, grading, and marketing of the crop, both for domestic use and for export. All farmers are required to gin with the cooperative and sell to it, but are not compelled to use all the cooperative's services which include sale of treated planting seed, fertilizers and insecticides, and use of airplanes and pilots for spraying. The cooperative is also responsible for enforcing government regulations pertaining to cotton growing. These include issuing planting licenses which each grower must obtain annually, fumigating planting seed, recommending procedures for controlling insects, requiring growers to destroy cotton planted on unlicensed areas (the latter seldom occurs), and to burn or plow under stalks after harvest. The cooperative strives to meet special needs as they arise, such as the training course conducted for spray pilots last year.

Alternative Crops

Natural conditions generally are well-suited to a number of different crops. There are exceptions, of course, because some of the soils are not nearly as rich as the alluvial volcanic soils found in parts of the coastal area, also, insects and diseases tend to thrive in the subtropical climate. Nevertheless, the pressure of increasing population upon limited land areas underlines the need to grow larger amounts of the basic food crops. The daily per capita food consumption is presently only 1,975 calories, well below minimum caloric nutritional standards of 2,600.

El Salvador is already on the way toward building a healthier foreign trade by diversifying its exports, thereby lessening the heavy dependence on coffee and cotton. Specifically, exports of other commodities have increased from less than 10 percent of total export value in 1950-57, to about 23 percent in 1961. This includes increased shipments of chemicals, manufactured articles, and food products other than coffee (such as seafood, sugar, fruits, and vegetables). Seafood exports, chiefly shrimp, increased from less than $5,000 in 1953 to $4.8 million in 1960. Experiments indicate dried fish, a valuable food source, might be provided at only a few cents a pound, thus permitting export of higher-priced beef. In turn, larger production of beef cattle breeds proven adapted to existing tropical conditions might be an attractive alternative to cotton. This is especially true of the more "marginal" areas where soil and other conditions are not especially favorable to cotton growing and yields are relatively low. Conditions seem well suited to production of melons, vegetables, pineapples, citrus, tobacco, and a variety of tropical fruits and nuts.

Much of the cotton acreage increase in recent years has taken place on land formerly used for pasture and crops other than cotton, especially corn and other grains. Industry sources indicated corn was perhaps the crop most closely competitive with cotton for the same land, although the value of cotton in the past few years has made it much more attractive than corn. At one time, corn production was much larger, and corn was exported to Honduras and Nicaragua, but those countries have now increased output and even ship some surplus to El Salvador at relatively attractive prices.

Production of sugar as a commercial crop more than doubled between 1950 and 1962. Continuation of improved sugarcane production practices by growers and increasing efficiency in milling and refinery operations hold promise for this growing industry. Production of henequen, chiefly by a few large producers, is encouraged by high import duties on competitive fibers and requirements that coffee be shipped in bags manufactured locally from this fiber. Kenaf is receiving attention as an alternative to henequen and to cotton because it requires less cultivation, resulting in lower production costs. Sesame and safflower are two crops in which interest seems to be growing, and production of these crops might increase further, particularly if returns from cotton decline.

Cost of Production

As with the other countries in this study, cost figures contained herein are approximations obtained from various cotton industry sources in the country. The figures should be considered as general guides only, rather than as data for precise comparisons, such as those arrived at by detailed cost analyses.

Costs in general have advanced over the past few years, especially as use of machinery and insecticides has increased and prices of these items have advanced. Some increase can also be attributed to such items as higher land rents and wage rates. However, there are variations in the overall pattern. For example, land rents, quoted at about $20 to $30 an acre in 1954-55, which are now in general $25 to $35, may be in some cases as high as $45 per acre.

The principal direct costs of production in El Salvador are estimated by informed industry sources at about 650 to 750 colons per manzana ($150 to $173 per acre) on large farms using machinery in most operations except for harvesting. By comparison, costs on small farms using oxen for power and relying largely on family labor were estimated at roughly 500 colons per manzana ($115 per acre). Other estimates of costs ranged from as low as about 435 colons per manzana ($100 per acre) to more than 800 colons per manzana ($185 per acre), with variations attributed chiefly to differences in type of operations and quantity and nature of inputs.

Labor for harvesting, and insecticides and their application, are the major cost items, comprising around one-half or more of the direct cash outlay. Pickers are paid by the pound. The minimum wage is $0.60 a day, but an average cotton picker makes about $1.20 a day plus $0.24 for food. This is higher than the 1954-55 average of about $1.00. The food requirements may be paid partly or all in cash. There are usually 3 or 4 pickings, and on the larger farms this is done mostly by migratory workers, many from the mountainous areas. Coffee, cotton, and sugar harvests overlap to some extent, and each requires considerable hand labor. As a result, some migrant laborers come in from Guatemala and Honduras to help with harvest.

Spraying for insect control, a major expense, may vary considerably depending on how many times spraying is performed. Cost of planes, pilots, and insecticides are significant. For example, pilots get from $9,000 to $12,000 per season, and this can go higher depending largely on gallons of insecticide applied.

Considering the high average yield for the nation, which has been at about 650 pounds or more per acre for 7 years, the cost of producing most of the crop would probably center around 23 cents per pound of lint, according to local industry estimates. Cottonseed, valued at about 2 cents a pound or $14 per bale, contributes to total gross receipts. With the price of 27 cents a pound for Middling 1-inch that prevailed early in the calendar year 1963, and high average yields, profits from cotton were attractive relative to alternative crops. However, a decline in cotton prices and an increase in costs, especially the high fixed-cost items, could well be reflected in lower cotton production in the future, especially for the less efficient producers.

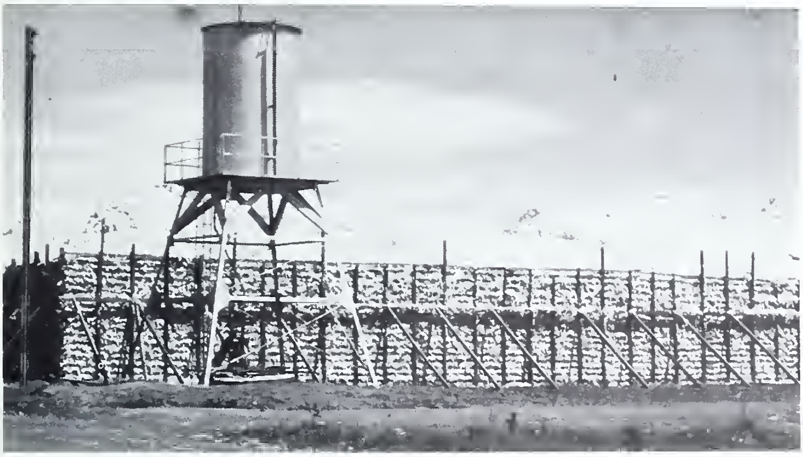
Harvesting and Ginning

Cotton harvesting is all done by hand. Use of mechanical pickers is considered impractical in light of the tall, thick nature of the cotton plants and the plentiful labor supply.

As cotton production has expanded in El Salvador, the number of gins has increased. For example, there were only four gins in the country in 1954-55, but the number had increased to 13 in 1962-63, and that season all gins were operating on a 24-hour, 7-day-a-week schedule to handle the big crop. About one-half of the gins have four stands and one-half have five stands. There was rather widespread opinion in the industry that this number was insufficient, and in the spring of 1963, the cooperative negotiated for purchase of four more gins. There are three gins each at Zacatecoluca and La Carrera, and four gins on one yard at El Papalon, just southeast of San Miguel.

Most of the gins have been installed since World War II and are relatively modern and in excellent condition. All are of U.S. manufacture, and include such equipment as driers, overhead cleaners, and lint cleaners.

Gin yard arrangements have been carefully planned. Seed cotton storage buildings or open bins are frequently in a circle around the gin building, with trash incinerator and piles of cottonseed in another part of the gin yard. Bale storage is at a more distant point, while sheds for storage of insecticides, airplanes, and other equipment are on the far edge of the gin plant area. At each gin, there are around a dozen seed cotton storage sheds that can accommodate the equivalent of about 5,000 bales of seed cotton. However, with the large 1962-63 crop, much cotton was stored without cover. Gin yard fires occasionally do some damage.



Above, pickers return from fields with seed cotton, on large El Salvador plantation. Harvesting is done almost entirely by hand.

Left and below, seed cotton and bales at El Salvador gins are frequently stored in the open, or may have to share covered storage space.

Bale tare aggregates about 9 pounds, consisting of cotton bagging weighing 2 pounds and 8 ties with buckles weighing 7 pounds. The legal minimum and maximum gross bale weights are 475 to 525 pounds, respectively, and most bale weights range from about 480 to 520 pounds, averaging about 500 pounds. A thin polyethelyene plastic strip is placed inside the bagging on one side of the bale in the pressing process to protect the lint from the ink used in stencil-marking the bales. Samples are cut from only one side of the bale during the entire local marketing process. Bales are standard density.

Marketing

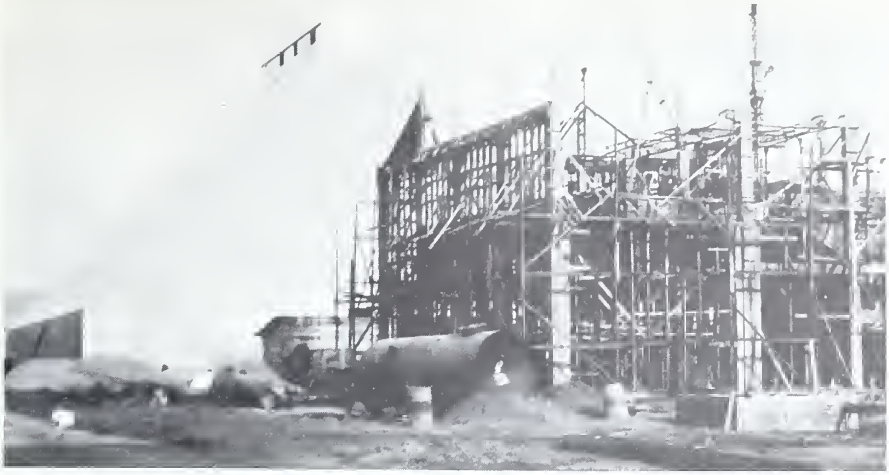
The cooperative markets the entire crop of cotton and cottonseed, both for domestic use and for export. About May of each year, local textile mills must let the cooperative know the quantity of cotton that will be needed for the next calendar year, and confirm this figure the following October. The cooperative stores the cotton for mills, for a fee, but mills must take all cotton remaining in storage on December 1 so that storage space can be made available for the new crop. Cotton is usually stored in the producing areas, or in the vicinity of San Salvador.

The major portion of the crop--95 percent in 1962-63--is exported. The proportion of cotton marketed through exporting firms has declined from earlier years since the cooperative now sells much cotton directly to foreign importers. Sales are on the basis of the cooperative's types, subject to arbitration. Cotton exported to Japan is usually sold f.o.b. steamer, while that going to Europe is shipped c. & f. or c.i.f. basis. The marketing section of the cooperative follows the international market situation closely. It may sell as much as one-third or so of the crop forward, before harvest, after evaluating the quantities and qualities likely to be available locally. As the growing and harvesting progress, calculations of expected availabilities are made at regular intervals, and additional forward sales may be made.

Upon delivery of cotton to the gin, the grower receives part of the estimated value of the lint, taking credit advances into account. Final settlement between the cooperative and the farmer is made after the end of the season, when lint and seed from the crop have been sold and returns to each grower calculated.

Moving the crop is relatively easy, since the country is small. Movement takes place largely in the Pacific coast and plateau areas, local mills and ports are accessible by road and rail, and one agency (the cooperative) handles the crop. The Inter-American Highway and the Coastal Highway cross the country from Guatemala to Honduras, and there are good secondary and farm roads. Most seed cotton is transported from farms to gins by truck, but some moves by ox-cart and farm wagon. The two railroads still provide an important means of transporting cotton from gins and warehouses to the local mills and to ports for export.

El Salvador has three ports, and rail connections with Puerto Barrios in Guatemala. At the deepwater port of Cutuco-La Union, cotton can be loaded



New crushing and refinery facilities in El Salvador being built to process domestically more cottonseed available from larger recent crops.

on ships directly from railroad cars. Bales are usually unloaded from railroad cars by fork or hand trucks and placed in railroad-owned storage where they may remain for 90 days at no charge to await ocean shipment. Storage under sheds or in warehouses is available for as much as 35,000 bales but seldom have more than 16,000 bales been stored at a time since coffee, cottonseed meal, and other commodities are usually in storage. Smaller quantities of cotton are handled at La Libertad, 23 miles south of San Salvador, which is accessible by highway but not by railroad. Warehouse storage is available there, but ships are loaded by lighter. At Acajutla, a breakwater pier as well as storage and unloading facilities have been added, but grains and commodities other than cotton are usually shipped through that port. Gin-run bales are not repressed to higher density before export.

Japan is by far the largest export market for Salvador's cotton. Between 50 and 90 percent of the exports moved to that destination in recent years. Most of the remainder is usually shipped to Western European countries, including West Germany, Netherlands, France, and the United Kingdom. It is interesting to note that before 1950 Guatemala took practically all the cotton exported from El Salvador. Small quantities of cotton linters were shipped to the United States in the 1954-58 period.

About 400 bales of cotton, reportedly of the Supra grade (equivalent to about Good Middling), were imported from the United States in both 1961-62 and 1962-63 for use by the domestic textile industry in blending with local cotton to make higher quality yarns. Imports of the equivalent of several thousand bales in 1955-56 through 1957-58 consisted of seed cotton shipped from Honduras to be ginned in El Salvador.

Each bale produced is classed by the cooperative classing office at Soyapango. The classing room appears to be well-equipped and has artificial lighting. One head classer and four assistants are employed. A truck picks up samples at gins each day and delivers them to the classing office. New boxes of the U.S. official Standards for Upland cotton are obtained each year, and are used in classing the cotton and setting up Salvador's own types. Samples are sent to the U.S. Department of Agriculture Board of Supervisory Cotton Examiners in Memphis at intervals for the purpose of checking class.

The El Salvador grade designations and approximate equivalents with U.S. Official Standards along with percentage of each produced in 1961-62, are as follows:

El Salvador Type	Approximate Equivalent Grade U.S. Standards	Percentage 1961-62 Crop
A Supra	Good Middling	1.0
B Magna	Strict Middling	9.7
C1 Ana	Middling	39.8
C2 Salva	Middling (slightly dull)	28.5
D1 Vera	Middling Light Spotted	0.6
D2 Slbd	Middling (off-color light gray)	13.4
D3 Mart	St. Low Middling (off-color gray)	3.5
E Lann	Low Middling Spotted	0.2
F Flor	Good Ordinary to St. G. O.	1.2
G1 Chrn	Below Grade	1.6
G2 Chrn	Below Grade	0.5
	Total	100.0

There is some indication that types may be revised prior to the 1963-64 harvest because of changes in gin equipment, varieties, and other factors. Staple length generally ranges from about 1 inch to 1-3/32 inches. Seed cotton is not graded, but attempts are made at gins to keep cotton separated according to grower, location, and variety.

A fiber laboratory is being installed by the cooperative near the classing room, with Fibrograph, Micronaire, and Pressley instruments. The testing, to begin in 1963-64, will be for the cooperative's own information for the time being to evaluate cotton of different varieites and from different areas, gins, and the like.

Consumption

The local textile industry now consumes, 30,000 bales of cotton a year, about 10 percent of the crop in 1962-63. Cotton consumption remained close to 13,000 bales for the 10 years, 1948 through 1957, but has doubled in the last 5 years. Increased capacity was provided by the construction in 1956 of a large new textile mill financed by Salvadoran and Japanese interests. That mill has 26,000 spindles at present, plans to increase the number to around 35,000 next year, and to 50,000 in the next 2 or 3 years. Installation of cotton print manufacturing facilities is planned with use of funds from a loan of slightly over $500,000 from the Central American Bank for Economic Integration. Also, some of the other textile firms have been adding new equipment and modernizing their plants with a view to increasing efficiency and volume of production. There are 11 textile mills, one of them government owned. Two of the mills account for nearly half the cotton consumption.

A rather wide range of cotton textile goods is produced in the country, including material for work and dress clothes; ticking, bags, and the like, yet a substantial portion of the country's textile needs is still imported.

Although the export of finished goods is relatively small, Salvadoran mills export some cotton yarn to mills in other Central American countries for further processing. One industry source indicated costs were still too high for Salvadoran textile goods to compete effectively outside Central America. However, there is some feeling that cotton consumption can expand further, reducing the imports of cotton textiles and providing for the rising needs of a population now increasing at the rate of about 3.5 percent a year. Perhaps even more significant is the expectation that per capita purchasing power of the population (now estimated at about 2.6 million people) will increase.

Pertinent to the whole matter of further consumption rises is the measure of protection to the industry to be afforded under the Central American Free Trade Area (CAFTA). Some industry leaders feel that if El Salvador and other Central American countries are to experience the economic growth vital to raising the people's level of living, some protection or assistance will be needed from lower-priced imported goods, at least while the industries are in development stages. Labor is relatively unskilled, but a concerted effort is being made to increase productivity through training programs in various technical operations. These include exchange of a few key laboring people with the Japanese, and also special instruction by Japanese technicians in El Salvador.

Some rayon and other manmade fibers are imported, but none are produced in El Salvador at present. However, present plans call for installation of dacron-manufacturing facilities, with production to begin in 3 years. The basic raw material needed would be imported, and the dacron would be used largely in dacron-cotton blends.

Outlook

A further cotton acreage increase appears likely in El Salvador for 1963-64. Local industry sources indicate plantings probably will be increased 15 percent or more above the 1962-63 area of 220,000 acres, and will constitute more than twice the 1955-59 average of 107,000 acres. The stimulus comes from favorable returns from cotton in the past year or so. Production in 1963-64 may increase to 375,000 bales, according to early estimates. However, as in other recent years, the increased cotton area will probably be from land formerly in corn and other food crops, and to a lesser extent, pasture.

Opinions among industry people differ as to the longer-term trend of cotton production in El Salvador, but based on current conditions the concensus seems to be that it may approach 450,000 bales within the next few years compared with the 1962-63 figure of 320,000 bales. Land is scarce and there is perhaps less future growth possibility in this regard than in Guatemala and Nicaragua. Nevertheless, some limited potentials mentioned by cotton experts in this regard included: use of part of the lands that may be irrigated from rivers; clearing and draining jungle land in the Southeast; planting cotton in some of the higher land areas with good water supplies; and, using land west of Acajutla along the coast toward Guatemala.

Whether, and how soon, such lands will be brought into cotton production will be tied closely to the price level of cotton and its attractiveness under mounting costs of production relative to returns from other crops. Also pertinent is the fact that the population continues to increase, and the need for growing more food crops cannot be bypassed.

Several industry sources feel that a substantial part of further production increases will result from higher yields. They indicated yields might go up a third above the present high figure of close to 1-1/2 bales per acre through improvements in insect control and use of fertilizer, and use of better adapted varieties. Also, mentioned was that more efficient farm management practices would contribute to yield increases. As irrigation becomes available, which may be a slow process, some people are hopeful of the possibilities of more double-cropping, such as growing cotton and a food crop on the same land in one year. Most of these changes would call for a more intense type of farming which appears more likely to develop in El Salvador than in the neighboring countries in the future. However, further increases in yields from an already high level will require accelerated efficiency which may be difficult in that tropical climate. Therefore, it is difficult to foresee any exceptional upsurge in cotton yields in El Salvador during the next several years.

In the past, the government has had a significant part in production and marketing of cotton, and this seems likely to continue because of cotton exports' significance in the national economy. However, the extent to which the government can afford to lend greater support to the cotton industry in the event of substantial or prolonged price declines seems questionable.

GUATEMALA

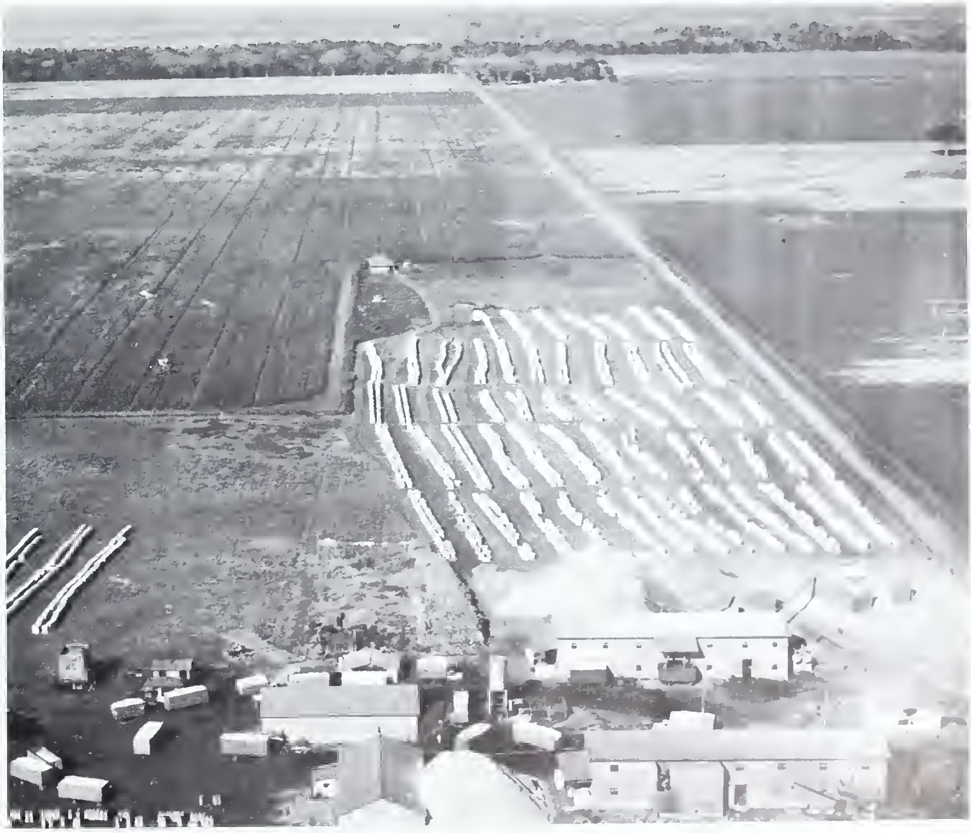
Trends in Cotton Production

Agriculture is Guatemala's primary industry. Nearly 70 percent of the working population are employed in agriculture, and more than 90 percent of the foreign exchange earnings come from agricultural commodities. In recent years, a striking change has been taking place in farm production patterns, with cotton moving to the forefront as a commercial crop and as a foreign exchange earner. Coffee and bananas had long been the major cash crops. Attention has shifted to other crops, especially cotton, sugar, and beef, chiefly as a result of the decline in world coffee prices in recent years and because of storm and disease damage to banana plants. One of the two large banana companies has withdrawn from Guatemala. The value of banana exports dropped almost 50 percent in 1962 from a year earlier. As a result, cotton surpassed bananas in foreign exchange earnings, and was second only to coffee. Currently, it appears that banana exports may rebound in 1963.

The rise in cotton production has been phenomenal. In 1962-63, over 200,000 bales were available for export, in contrast with the situation just 10 years earlier when it was necessary to import cotton to meet part of the needs of domestic textile mills. Stimulants to Guatemalan cotton output included high cotton prices in world import markets in the early 1950's, control of malaria in the Pacific coastal regions, and new roads. The Production Development Institute pushed production on National farms (Communist at the time), and the price of cotton was supported at about 40 cents a pound to encourage private landholders. By 1953-54, the crop exceeded requirements, and the fixed minimum price program was discontinued in 1954. Late in 1954, a producers' cooperative was formed to do ginning and marketing.

Unsettled political conditions from time to time have had an effect on the expansion of cotton, but acreage increased from only 6,000 acres in 1950-51 to 64,000 in 1960-61, then shot up to 115,000 in 1961-62 and 170,000 in 1962-63. Within the last two or three years attractive returns from cotton have encouraged its planting on former banana lands, pasture lands, and newly cleared jungle areas.

Yields per acre have more than doubled in the past 10 years. Consequently, production has shown the combined effect of steep rises in area and in yield as well, increasing from only 4,000 bales in 1950-51 to 95,000 bales in 1960-61, then more than doubling to 250,000 bales in 1962-63.



Scene near Tiquisate, Guatemala, illustrates conquest of jungle for cotton culture. Fields of cotton recently cleared reach from jungle in background up to gins, with some cotton still unpicked in fields, and long rows of bales and piles of cottonseed which await shipment.

Cotton is grown in the Pacific coastal lowlands, the best agricultural area in the country, because of the deep fertile alluvial soils, the level nature of the land which permits use of mechanical equipment, and the favorable climate. This coastal plain is about 200 miles long, extending from Mexico on the northwest to El Salvador on the southeast, and varies in width from 20 to 40 miles inland from the Pacific to the Sierra Madre. Much of the region is still covered with jungle, but cropland acreage increases since 1950 include large tracts now in banana trees, sugar cane, and cotton fields that have been claimed from the jungle.

In the Pacific coastal region there are distinct wet and dry seasons, each lasting about 6 months. In the wet season rains fall almost daily from May to late October or early November. Annual average rainfall varies from about 55 inches in some localities to over 100 inches in others.

Production of cotton formerly was concentrated in the Departments of Escuintla, Retalhuleu, and Suchitepequez. While production has continued to increase in those areas, expansion has also taken place in the Departments of Quezaltenango, Santo Rosa, and San Marcos. In the Central Highlands, coffee is the main cash crop, while small farms are primarily devoted to producing subsistence food crops. The Caribbean lowland is a small flat region with alluvial soils and heavy rainfall in the cotton harvest season. The Peten is a large plain in the north almost completely covered by forests, but there are a few pastures. In general, soils in this region are thin and poor, roads are nonexistent, and most lands are government-owned.

Production Practices

Cotton farming in Guatemala is on a large-scale commercial basis for the most part, although some cotton is grown on small family-type units. Large cotton-cattle operations, using labor interchangeably and effectively, are common. An estimated 20 percent of the cotton acreage is rented, and a variety of systems are used in cotton farming, including operations by owners, administrators (farm managers), and partnerships. Many farms over 100 acres are operated by "ladinos", people of mixed Indian and Spanish blood, while transient laborers, mostly Indians from the Central Highlands, fill the large seasonal requirements. Some cotton growers are from the United States, while some others were educated or trained in this country.

Labor efficiency is rather low, and most day laborers show little incentive, according to some farmers. While there seems to be good "top management" among the entrepreneurs, the supply of middle management personnel is considered by many producers to be inadequate. For example, operators of mechanical equipment are relatively unskilled and need much supervision. As a result, tractors and other equipment do not get proper care and wear out quickly. Labor efficiency, especially skill in modern production methods, and supply of labor have a definite bearing on costs as well as the rate of future expansion of cotton output. Availability of labor, particularly in the harvest season, is already causing some problems.

Machinery is used in much of the production process, and heavy equipment is used in clearing new land from the jungle. Like fertilizers, insecticides, and many other items, machinery must be imported and is subject to extra levies in addition to import duties. However, in May 1963, import duties were removed on high-quality planting seed to encourage their use.

There have been official and private efforts to limit plantings to one variety in Guatemala and to plant varieties most suitable to local conditions, but these efforts have not been completely successful. All of the cotton is American Upland type, and new registered and certified seed for planting a part of the crop are imported each year from the United States. An attempt is made to keep a sufficient supply of new seed circulating so that farmers do not plant any seed older than second generation. About 95 percent of the acreage was in Deltapine 15 in 1954-55, and that variety was prominent until recently. In 1962-63, 90 percent was in Deltapine Smooth Leaf and the other 10 percent in Deltapine 15 and Stoneville 7.

A keen desire seems to prevail among the larger growers to use varieties that will give the highest yields per acre and best fiber and spinning results. For example, quite a few contacts in the industry felt a concerted effort should be made to increase fiber strength (Pressley test), from the present average of around 76,000-78,000 pounds per square inch to around 90,000 pounds. Considerable interest and support has been shown in the work carried on for several years now by the FAO technician, Dr. F. S. Parsons, working on cotton in Central America. In addition to work on varieties, the technician have also studied other physical factors in the production process such as fertilizers and spacing of rows.

Use of commercial fertilizers is not widespread. On new lands recently cleared of jungle growth, fertilizers usually are not applied. In fact, some farmers feel that on the best soils, fertilizers may cause excessive plant growth. However, the fine soil loses fertility through leaching under tropical rainfall conditions and is subject to wind and water erosion, so that fertilizer use, crop rotation, and conservation programs will need to be adopted if current high yields are to be maintained. Fertilizer use is most common in the older producing areas around Escuintla. One grower said he uses about 175 pounds per acre, usually 15-15-15 or 15-15-12, then side dresses later with nitrogen. All fertilizer is imported and is relatively expensive. A few farmers plant a green cover crop in winter and turn it under, but use of organic material is still minor.

The main insect pests are boll weevil, bollworm, leafworm, cutworms, salt-marsh caterpillar, false bollworm, cotton stainers, aphids, and red spider. The insect hazard at present is a major hurdle to overcome. An interesting contrast was pointed out by one grower who said no insecticides were used in 1924 when he began growing cotton. Rains during the growing season make frequent application of insecticides necessary, which is usually handled on a regular basis by spraying from airplanes, although small amounts are applied with hand equipment. Some growers spray as many as 35 times a year. Weekly sprayings from August through December (about 20 times) are perhaps more common. Recommendations of insecticide companies are sometimes followed as to kinds of insecticides and frequency of application. Cotton stalks are usually plowed up and destroyed after harvest

Planes, such as this one in Guatemala, spray cotton plants with liquid insecticides as many as 30 times a season. Shed is used for purpose of loading insecticide on plane.

in an attempt to reduce carryover of insects into the next season. Diseases thus far seem less of a menace to the crop than insects, but Leaf Spot, Black Arm, and Verticillum Wilt have been noted in a few localities.

No cotton land is irrigated in Guatemala. Banana areas are irrigated by overhead systems and there is some flood irrigation of pastures in the dry season. Apparently there is no plan at present to develop irrigation for cotton land. There may be more irrigation of pastures in future years, which would presumably increase the number of cattle that could be carried per acre and possibly release more pasture land to cotton. However, availability of land is not yet a critical factor in expansion of cotton. This contrasts with the situation in El Salvador, for example.

Financing

Credit is an important element in cotton production in Guatemala, as most producers use some form of credit. Industry sources indicated that it is customary for a producer to borrow as much as 80 percent of the out-of-pocket expense he expects to incur in producing the crop. The loan is obtained for about an 8-month period at the rate of 8 percent per annum, with a small additional service charge.

Credit has not always been readily obtainable in past years, and because of risks involved in physical, economic, and political changes, interest rates have been rather high. These same factors could have a strong bearing on future trends in cotton production, although for the past two or three years credit has eased with the attractive returns realized from cotton.

In the early 1950's the Institute of Production Development (INFOP) was the source of practically all cotton production credit. To further its objective of expanding cotton production for export, most INFOP loans were made to cotton growers, especially those with 220 acres of land or more. A small proportion of the crops was financed by either the National Mortgage Bank or the National Agricultural Bank. In 1957, the Agricultural Bank, S.A., was founded and began to grant credit for equipment and current production expenses.

At present, production credit is usually obtained from the national banks or from private sources, either by the individual growers or through the cooperative. For example, the AGUAPA cooperative reported that for the 1962-63 season, 20 of its members obtained average loans of $37,500 each from the Agricultural Bank, S.A., 16 members borrowed an average of $38,200 each from the INFOP, and some members borrowed unreported amounts from the Bank of Occidente. The AGUAPA cooperative report of November 1962 stated that growers may soon "be able to secure self-financing through a Cotton Bank." According to the report, cotton credits would shift from national banks which then "may tend to channel their resources towards new sources of production." The cooperative also reported recent credit offers from private U.S. sources at lower than present local rates to finance production, marketing, and related economic activities. In the AGSA cooperative, approximately one-third of the financing was obtained from national banks, and two-thirds from private banks.

Alternative Crops

The present situation with respect to cotton and alternative crops is perhaps not typical of what might be expected over the long run since returns from cotton have been especially attractive in the last two seasons. Under different circumstances, other crops might gain a larger proportion of investment capital and management efforts. In the future, as in the past, there could be some shift in crop land use, linked to changes in income opportunities. For example, there was a significant shift from cotton to corn, pasture land, and cattle in 1957 because of low yields and declining prices of cotton, accompanied by a shortage and high price of corn in 1956. Usually, however, corn is considered a subsistence crop and does not compete closely with cotton.

Enterprises which seem most likely to claim attention of investment capital in competition with cotton are cattle, bananas, and sugarcane. Still other commercial-type crops probably could and should receive attention, especially in the interest of diversification. For example, there seems to be some potential for essential oil crops such as lemon grass and citronella, even though care would need to be exercised that oversupply did not develop and adversely affect prices. Also, new ad valorem export taxes on citronella and lemon grass oils became effective in July 1963. An Association of Essential Oil Producers is already set up which guarantees quality, establishes prices, and markets the oil crops, and is interested in development of still other crops such as vetiver, cardamon, peppermint, and eucalyptus. Additional diversification opportunities might be found in tropical fruits and melons with the establishment of satisfactory export markets.

Banana production in Guatemala declined in 1962, largely because of storm and disease damage to plants. This is evidenced by the fact that the value of banana exports amounted to only $6.2 million in 1962 compared with a 1959-61 average of $11.5 million. One of the two large banana-producing companies has completely withdrawn from Guatemala. Cotton moved in to claim some of the former banana land. Just what will develop regarding the situation of bananas versus other crops in years to come is a matter of conjecture, but it does not necessarily hold that the 1962 drop in banana production will continue, as indicated by the rise of banana exports in the first quarter of 1963.

From the standpoint of land availability, there is no close and pressing competition between commercial crops. One reason for this is that land is relatively plentiful thus far, in contrast with the scarcity in El Salvador, for example. Extensive areas of land are available, although there is considerable expense in clearing jungle and developing the land, as well as in building roads and providing other facilities before optimum commercial production can be realized. Important features in this regard are the public landholdings and political uncertainties. Some of the chief commercial crops are not closely competitive for the same land because of their nature. For example, cotton is grown in the lowlands, sugarcane is usually grown on slightly higher elevations, and coffee in the highlands. However, there is some overlapping labor need between these crops, especially during the harvest season. Beans, grains, vegetables, and other food crops are rather plentiful on a countrywide basis, but more so in some areas than others. Generally, food crops are not yet exerting any pressure for land used for commercial crops such as sugar cane and cotton, but this situation could change over the years with mounting food needs of population increasing at about 3 percent a year.

Cost of Production

As pointed out in the section on Nicaragua, cost figures cited herein are estimates obtained from various local industry sources, and are not all-inclusive but are intended merely to give some idea of the principal direct costs.

Cotton is basically considered a mechanically-produced crop but man-hour requirements per unit are high because all picking is by hand, and some thinning and chopping are performed by hand rather than machines. Low labor productivity adds to the cost of labor per unit of output. If production of commercial crops in the coastal region should expand significantly and there should be increased demands on the Indian labor supply, costs would probably rise further.

Generally, cotton production costs have tended to increase with wage rates and costs of other input items, many of which must be imported. For example, expensive outlay must be made in import of airplanes, tractors, cultivating equipment, planting seed, fertilizers, insecticides, gins, trucks, replacement parts, and so on. A September 1963 decree-law requires that foreign pilots pay a fee of 1 cent for each gallon of insecticide they apply by plane. This may tend to be reflected in further increases in the cost of cotton production.

The principal direct costs of production, as estimated by reliable industry sources, averaged about $150 per acre in 1962-63. The biggest cost items are insect control and picking. Together, they account for about 60 percent of total direct costs. Of course, the proportions as well as the total dollars vary, depending, for example, on the method used in carrying out each operation, or how many times and how much insecticides are applied. The quantity of insecticide in turn may depend on extent of infestation, and on frequency with which rains come and wash off the insecticides.

To the direct costs must be added such items as equipment amortization and land costs. Current land rents are about $15 to $20 an acre, payable in advance. The price of some of the better cleared land in the Pacific coastal area is around $150 per acre. Uncleared jungle land is selling for about $35 to $40 an acre. Expenses of clearing the land by machine may vary from about $80 to $150 per acre, depending on density of growth, location, and the like. Some soils in the low land areas have to be drained after being cleared, adding further to costs. One grower indicated costs are substantial in converting banana land to cotton, which involves removing the banana trees and taking up the drain tile.

Wages for picking cotton are 2 cents a pound for the first and second pickings, then they go up to 3 cents for later pickings and sometimes higher in the scrapping stage. Ginning charges are quoted at 2.8 and 2.9 cents per pound of lint, or about $13.50 to $14.00 per bale. This cost could be offset by the returns from cottonseed, assuming a seed value of around $14.00 per bale. Loading and hauling bales from gins to the port costs about $0.70 per quintal or $3.50 per bale.

A tax on cotton exports became effective on July 12, 1963. The new tax on ginned cotton is 10 percent ad valorem on the excess received over the f.o.b. price of $20.00 per quintal (cwt).[2] This, together with a 23 percent increase in tax on fuel and the recently imposed income tax, will tend to reduce net returns from cotton and may affect the area planted to cotton in the future.

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[2] Similar tariffs are being assessed against unginned cotton, cotton waste, and carded or combed cotton. A quintal is a Spanish hundredweight of 101.4 pounds.

A new decree-law was passed in August 1963, which requires certain practices in production of cotton. These pertain to such matters as licenses to plant, turning under crop residues, production and importation of seed, and registration of cotton gins. Although many parts of this decree are essentially the same as those in a governmental decree of March 20, 1952, the limit of fines for violations is raised from $5 to $2,000. Also, considerable concern has been expressed in the cotton industry over Article 8 of the decree, which requires that after 4 consecutive years of planting to cotton, the harvested area must be planted to a leguminous crop during the next 2 years. Many have expressed the feeling that this requirement would substantially retard cotton production in Guatemala, and an effort is underway to get the requirement changed.

Yields are an important consideration in evaluating costs of production. In recent years, yields per acre in Guatemala have been among the highest in the world for nonirrigated cotton, averaging over 1.5 bales in 1959-60 and 1960-61, and 1.25 bales in 1961-62. In 1962-63, weather conditions were excellent, yields averaged close to 1.5 bales per acre, and reports of 3 bales per acre were not uncommon. Should yields drop considerably as a result of insect or weather damage, or other causes, returns from cotton would be lower. Similarly, should prices drop with costs continuing to rise, the attractiveness of cotton would likely subside, particularly for the "marginal" growers whose costs were above average and/or whose yields per acre were below the norm.

Harvesting And Ginning

Cotton is harvested by hand in Guatemala. It is usually picked three or more times over a period from late November through March. Transient labor is used to a large extent, and efficiency is rather low. One reason is that performance of seasonal workers from the mountains declines in the high temperature and humidity of the lowlands. Also plants are 6 to 8 feet tall, and branches are intertangled, making picking difficult.

This also augurs against use of picking machines which have been tried from time to time but have not worked well because the plants are large and the cotton matures at different times over a substantial period. Also, it is felt that any savings that might be effected by machine pickers would be more than offset by lower qualities resulting from that method of harvesting as well as the financial investment in imported machines and parts, and the lack of qualified service personnel. Should labor become scarce in the future, machine pickers may come into use. At the same time, efforts would probably be made to use varieties, row spacing, and techniques that would facilitiate machine picking.

In 1954-55 there were only 8 gins in Guatemala with a total of 26 stands. As production has increased, so have ginning facilities, and in 1962-63 there were 21 gins with a total of 65 stands. There are now nine gins with four stands each, seven with three stands, three with two stands, and two with one stand. Ten of the gins are privately or independently operated. The other 11

Seed cotton in Guatemala. This has been hand picked and left in large mounds in the field, protected by a cover of palm leaves, before being hauled by truck to the gin.

are operated by the 3 cotton cooperatives primarily for their members, but they also do some ginning for nonmembers. Gins are all of U.S. manufacture. The more recently-acquired gins, some of which are only a year or so old, are high-speed, turning out a bale every 3-1/2 to 4 minutes. Equipment in the newer gins includes dryers, considerable seed cotton cleaning equipment, and lint cleaners.

Ginning capacity seems reasonably adequate, although with the large 1962-63 crop, gins were operating 24 hours a day, 7 days a week during the rush of harvest. Should the crop continue to increase in the future, it seems likely that additional gin facilities will be built, or old equipment replaced or supplemented. Covered storage facilities for seed cotton and bales are the exception. In fact, the common practice at gins in Guatemala is to store seed cotton, bales, and cottonseed in the open, and attempt to gin and move the crop as rapidly as possible. Since this is done in the dry season, damage from open storage is probably minor. However, covered storage for any extended length of time would probably be desirable, especially if ginning and movement is not completed before the rainy season begins in April.

Gin outturn from seed cotton is around 36 percent. Gross weight of bales averages slightly over 500 pounds.[3] Tare of 8 pounds is composed of 8 steel ties weighing 6-1/2 pounds, and a thin cotton bagging which weighs only about 1-1/2 pounds. The cotton bagging is all made by the local textile industry, and though it tears rather easily, bales are usually handled without hooks, and reportedly the bagging reaches destinations in good condition.

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[3] Bale weights quoted in this study have been converted to the basis of 480 pounds net unless otherwise specified.

In Guatemala, mountains of cottonseed accumulate near a gin as harvesting and ginning continue more rapidly than seed is removed. Some seed is bagged, and will be exported.

Marketing

Local consumption accounted for about 20 percent of the disappearance of the Guatemalan cotton crop during the late 1950's, but with recent production increases this proportion declined to 17 percent in 1961-62 and 12 percent in 1962-63. Thus, the large majority of the crop moves to overseas markets. Japan has been the principal buyer of Guatemalan cotton in recent years. Other buyers included Western European countries, principally those in the Common Market.

Marketing methods for the most part are rather direct. Most of the growers who do not belong to one of the three cooperatives, have rather large quantities to offer, and they usually sell direct to the merchants, many of whom represent U.S. firms. It was estimated that about six large growers accounted for about 30 percent of total production in 1962-63, around 60 percent was produced by members of cooperatives, and the remaining 10 percent by other independent growers.

Following withdrawal from market operations of the Production Development Institute, operated by the Communist regime in 1953-54, a producers' cooperative which was formed in December 1954, ginned and marketed about 60 percent of the 1954-55 crop. By 1958-59, another cooperative had been established, and a third was formed shortly afterward. The three cooperatives are the Asociacion Guatemalteca de Productores de Algodon (AGUAPA), Algodonera Guatemalteca, S.A. (AGSA), and Algodonera Retalteca, S.A. (ARSA). The estimated proportion of the 1962-63 crop handled by each was 15, 30, and 15 percent, respectively. These organizations provide a wide variety of services for their members, including importation of insecticides, planting seed, and fertilizer; operation of a machinery pool; provision of facilities for spraying insecticides by airplanes; procurement of credit;

Shallow water port of Champerico, Guatemala. Cotton may be stored in open until it can be loaded into oceangoing vessels by lighters. During the 1961-62 crop year, nearly 60 percent of the nation's cotton exports moved through this port.

conducting research; dissemination of information on research and production practices; and, provision of ginning, grading, and marketing services for members. Members are not required to use all the services offered by the cooperative.

After the producer's cotton is ginned at the cooperative gin, it is sampled and graded, then delivered against prior sales in even running lots. The cooperatives usually sell as much as 3 or 4 months in advance to local merchants who in turn sell to foreign importers on their own types, f.o.b. steamer. One of the cooperatives sells on the basis of the U.S. Official Standards or description against the standards, getting new boxes from the United States each year. The other two cooperatives have developed their own types. There is some feeling that Guatemala should develop and adopt national standards such as in El Salvador. After the cotton is sold by the cooperative, credit obligations of grower-members are met at the bank, then payments are made to members, with final accounting at the end of the season.

Cotton is usually hauled by trucks or rail from gins to one or the other of the two shallow-water Pacific coast ports, San Jose or Champerico. There it may be stored in the open until it can be loaded from lighters. Although roads and port facilities have been increased and improved with the rise in cotton production, they are rather inadequate, especially since coffee, bananas, and other export commodities also move through these ports. However, most import shipments and some exports (except for cotton) are through Puerto Barrios on the Caribbean.

Consumption

During the late 1940's and throughout the 1950's cotton consumption ranged between 11,000 and 15,000 bales annually. A rise started in 1960-61, and by 1962-63 cotton consumption was about 30,000 bales a year. Nevertheless, usage has not increased nearly as fast as production, so that domestic offtake accounts for a smaller proportion of the crop than formerly.

The recent rise in consumption reflects the addition of a moderate amount of new equipment and plant expansion by the domestic textile industry. Present changes will not be completed until sometime in 1964. A new textile mill with an annual capacity of about 5,000 bales is being built in Antigua. There are two larger textile mills which have relatively new equipment, and five smaller ones with older equipment. All manufacture mostly coarse cotton goods for the local laboring people. The mills carry out all processing operations including spinning, weaving, and finishing, some even producing part of their own raw cotton needs. Some manmade fibers are imported to blend with cotton, but no manmade fibers are produced locally.

Despite larger volume manufacturing of textiles than formerly, production falls far short of domestic needs and substantial quantities of textiles, both of cotton and of manmade fibers, are imported. Recent official statistics are not available, but one industry representative estimates textile imports now amount to several million dollars a year. Textile imports are likely to remain sizable for some time to come as the domestic industry finds it difficult to compete with imported textiles made by the large modern industries of other countries. Further increases in cotton consumption are likely to be relatively slow over the longer term, and may just about keep up with population increases, currently about 3 percent per year. The government thus far has not provided protection or assistance toward development of the textile industry, and it has been difficult to obtain the large amount of capital needed for extensive improvement and growth.

On the other hand, some optimism was voiced by textile mill people concerning prospects for obtaining development loans through the Central American Bank for Economic Integration in Tegucigalpa, Honduras, funded by the United States and member countries. Later in June 1963, that bank announced two such loans for purchase and installation of machinery and equipment. One loan for $150,000 went to a firm producing cotton and rayon fabrics, and the other for $225,000, to a manufacturer of textiles from synthetic fibers. Also, more effective competition, including that with imported textiles, may be possible under Central American Common Market arrangements. Production of colorful specialty fabrics woven by the Indian natives might be expanded, at least on a modest scale, with development of markets in other countries.

Outlook

Guatemala probably has the greatest natural potential for expansion of cotton production of all the Central American countries. Much additional land can be devoted to cotton or other crops, despite the nearly 300 percent increase in cotton acreage between 1959 and 1962 which claimed land formerly in bananas, pastures, and jungle. Also, soils and climatic conditions have proven especially favorable for growing cotton, although this is counterbalanced partially by some unfavorable conditions such as damage from insect infestations. There are also some limitations in the physical facilities such as roads, storage accommodations, and ports which are still far from ideal and would need to be expanded and improved if Guatemala were to increase substantially its cotton production in the years to come.

Consideration of these factors indicates that economic, rather than natural, forces are mostly likely to determine the future trend of cotton production, within limits. These include such important considerations as movements of raw cotton prices in international markets, along with rising costs of production. Also, production credit availabilities will be important. In most past years, credit was limited largely because of lack of depth in financial resources of domestic banks. While more interest is now being shown by private credit sources outside the country, including U.S. sources, this may be withdrawn should returns from growing cotton become relatively unattractive. Political uncertainties could have a definite bearing on the willingness of entrepreneurs to make the substantial long-term investment necessary for further development of the cotton industry on a commercial scale.

General agreement exists among those associated with the cotton industry that availability of labor could affect the rate of expansion in cotton output. Scarcity of skilled labor, especially in the immediate supervisory to mid-management levels, is already creating some problems. Also, the supply of unskilled laborers is somewhat inadequate, especially at harvest time. This results from increased demand for migratory workers to harvest crops of coffee, sugarcane, and cotton, all of which mature at about the same time of year.

One fact not to be overlooked is that considerable experience and know-how, some by U.S. citizens, is invested in the large-scale, well-conducted cotton production operations. Although optimism is naturally high following favorable prices and yields in the last two seasons, cotton production is far from a land-rush type of operation. There seems to be a definite consciousness of the many risks involved, both physical and economic.

In the next few years there will likely be further increases in cotton production, but probably at a slower rate than recently. In contrast with acreage increases of 45 percent or more in each of the last three seasons, acreage authorized for planting in 1963-64 increased 27 percent over 1962-63. The surge in clearing of jungle land for cotton and the takeover of banana and pasture land for cotton use seems to have slowed somewhat, at least for the time being. If the same yields are obtained as in 1962-63, production in 1963-64 could total 300,000 bales or more.

Many well-informed persons in the local cotton industry forecast that cotton production in Guatemala over the next 5 years or so will probably increase to around 500,000 bales, compared with 250,000 in 1962-63. Much of the increase will be through additional acreage, as land so far is not the limiting factor. The expansion is most likely to be in those parts of the Pacific coastal plains near the Mexican border rather than on the eastern end. In the more distant future, some cotton growing may be tried in other parts of the country. A number of producers pointed out that yields are already high and found it difficult to foresee more than a slow rise.

HONDURAS

Trends in Cotton Production

Agriculture is the mainstay of the Honduran economy, but cotton plays only a small part in it, accounting for less than 1 percent of export values in 1961. Bananas are still the leading export crop, but banana exports have declined from 90 percent of all exports in the 1930's to around 45 percent in the early 1960's, largely as a result of natural adversities and shifts to other crops. Coffee, the second most significant export since World War II, and a number of other commodities, exceed cotton in export value, including lumber, corn, beef, cattle, beans, and hogs.

Natural conditions have limited cotton production. Rugged topography renders about three-fourths of Honduras unsuitable for agricultural use, and the hot lowlands on the Caribbean are better suited to bananas and other tropical crops than to cotton. A few years ago, cotton growing in the interior valleys found some appeal, and production rose from 4,000 bales in 1955-56 to 18,000 just 2 years later. In fact, in 1958 and 1959 cotton became the fourth-ranking export. Later, rains damaged bales stored in the open in the interior of the country, prices drifted downward, the credit situation worsened, and production declined to 6,000 bales by 1960-61. Some of the acreage formerly in cotton was shifted to corn, beans, and other crops. At growers' request, the government withdrew the production tax of 75 cents per 100 pounds. The National Development Bank adopted the policy of making crop loans only to growers using lands considered suitable for cotton, thus forcing out low-yielding lands. Production shifted to the Pacific coastal area and jumped to 17,000 bales in 1961-62 and 21,000 bales in 1962-63.

In 1962-63, 51 farmers planted an average of 315 acres of cotton each, with about one-half having 100 manzanas (1.73 acres) or less. Nearly 80 percent of the cotton acreage was in Choluteca Department, and the remainder was in Valle Department. The coastal plains, in the shape of a crescent around the Gulf of Fonseca, are similar to those in neighboring countries, but are only 45 miles long and 1 to 2 miles deep (inland) except to Valle area where they extend 12 miles inland. The lowland soils are fairly deep but are sandy near the rivers, while clay soils predominate some distance from the rivers and into the hills.

Production Practices

Although there is still some use of oxen, most farmers now use tractors with two- and four-row equipment in their farming operations. Use of commercial fertilizer is rather widespread and averages about 300 to 400 pounds per acre, depending on needs and grower preferences. Industry sources indicated fertilizers have made an important difference in yields per acre, which have increased from an average of slightly under 400 pounds in the 1955-59 period to 691 pounds in 1961-62 and 639 in 1962-63. There is no irrigation of cotton at present, but irrigation is a possibility that might affect future production. Almost all the cotton in Honduras in 1962-63 was the Deltapine 15 variety. The cooperative imports some improved planting seed from the United States each year.

The Cotton Cooperative

An organization of 205 cotton producers, Cooperativa Algodonera de Honduras, Ltda., was established in February 1955 by a leading group of agricultaralists interested in establishing cotton as a foreign exchange earning crop. The organization imported planting seed, fertilizer, and agricultural machinery for its members, marketed members' cotton and secured credit for members to purchase seed and machinery. Following losses on cotton through rain damage, mounting debts, and price declines, the cooperative was dissolved in July 1960. However, growers continued to function informally as a form of cooperative until October 1962, when a new private organization, the Cooperativa Algodonera del Sur, Ltda., was established with 48 members. The new cooperate provides such services and materials as planting seed, spraying, fertilizers, technical advice, and selling cotton for the members.

Financing

All growers use some production credit. It is obtained from the government-owned National Development Bank, which financed about 80 percent of the acreage in 1962-63, and private sources which financed 20 percent. The cooperative does not finance cotton production.

Cost of Production

Costs of production have tended to rise, but are generally lower than in El Salvador and Nicaragua. One source close to the production situation estimated that direct production costs totaled about $120 per acre in 1962-63 for small producers with around 35 acres or less. For large producers, direct costs are estimated at a higher figure of around $140 per acre, principally because they hire more labor, including farm administrators and foreman. Other costs, such as land rent, equipment depreciation, and interest on investment are additional. Only about 2 years ago, land rents were around $12 per acre, but they increased to around $17 by 1962-63, and $20 per acre in 1963-64. While Salvadorans have farmed in Honduras for years, their renewed interest contributed to rising land rents. Insect control and harvesting are the biggest costs. Application of insecticides by airplanes on the larger farms is a substantial cost item, but on the small farms where small tank sprayers are used, the cost is lower. The boll weevil is the major insect pest. All the crop is hand picked, and wages for picking are $1.00 per hundredweight of seed cotton for the first and second pickings, $1.50 for third and fourth pickings, if any, and $2.00 for the final or "scrapping" operation.

Ginning

The National Development Bank owns and operates the two gins in the country, both of which are now located on the same yard at San Lorenzo. It is possible that the cooperative will purchase the gins from the bank. Up through the mid 1950's, there were no ginning facilities and seed cotton was hauled to El Salvador for ginning. The first gin was set up in 1957 near Tegucigalpa, and was financed jointly by the cooperative and the Bank. The second gin was installed early in 1959 at San Lorenzo by the cooperative with a loan guaranteed by the Bank. The first gin, after standing idle for 3 years because of the shift in the production area, was moved to San Lorenzo in January 1963. There are two gin buildings, each with Diesel-powered engines, four relatively modern gin stands, dryers, and linter cleaners. Storage sheds will hold about 3,500 tons of seed cotton, while bales are stored in the open. Plans call for building more storage facilities, houses for employees, and other structures. Bales average about 500 pounds gross weight, and are covered with light-weight jute bugging. Total tare is 12 pounds. Ginning outturn of lint from seed cotton is about 36.5 percent. Ginning charges are 6.2 lempiras per quintal of lint, or about $15.65 per bale. This includes bagging of cottonseed, all of which (about 8,000 to 9,000 tons) is being exported to Japan.

Marketing

Once the grower delivers the seed cotton to the gin, his part in the marketing process is completed. The bank then advances the grower about two-thirds of the estimated value of the cotton pending final settlement of all accounts for the crop year. After the bank has collected loans, the cooperative sends samples from each bale to the El Salvador cooperative at Soyapango for classing and marketing of the cotton. In 1963-64, the cooperative plans to have the classing done locally. In 1961-62 and 1962-63, all the cotton for export was sold by the cooperative to one exporting firm. Most of the cotton is now exported to Japan or Europe. In previous years it went to El Salvador for ginning and/or marketing.

Cotton and cottonseed are hauled by cooperative truck to the port of San Lorenzo on the Bay of Fonseca, only about 3 miles from the gins. Loading onto ships, which must anchor some distance away at the deep-water site of Amapala, is by lighter. Privately owned covered storage is available for 8,000 to 10,000 bales in San Lorenzo and on the island of El Tigre. Cost of loading cotton or cottonseed at the gin, hauling to the port, and then unloading, is estimated at 12 centavos (6 U.S. cents) per hundredweight. This amounts to 30 cents per bale for cotton and $1.20 per ton for cottonseed.

Consumption

Consumption by the only textile mill in Honduras, Rio Lindo, located in Tegucigalpa, has been about 2,000 to 3,000 bales a year over the past several years. Mill stocks on August 1 are usually adequate until the new crop becomes available in January. The mill has been operating on a 24-hour-per-day basis all year. A new modern mill, using some of the best equipment in the existing mill, is planned for the near future. A loan of $1,905,000 to finance the construction of the new mill, which would use about 5,000 bales a year, was made in June 1963 by the Central American Bank for Economic Integration.

Outlook

The cotton area is expected to increase from 16,000 acres, in 1962-63, to 21,000 acres in 1963-64. This reflects increasing interest in growing cotton because of favorable returns from recent crops. Industry representatives feel that the maximum practical limit for cotton acreage in Honduras is about 50,000 acres or slightly more, and that this figure will be reached in about 3 years. Production on 50,000 acres would total around 75,000 bales if yield of lint per acre were to equal the average of close to 1.4 bales per acre obtained in 1961-62 and 1962-63.

Factors which tend to curb production expansion include limited area suitable for growing cotton, conservatism among capital investment interests, some scarcity of labor, and increasing livestock operations. Beef and dairy cattle are attracting attention, as are alternative crops such as rice, corn, beans, and fruit.

When cotton acreage was reduced in 1959-60 and 1960-61, marginal cotton lands were withdrawn from cotton and planted in corn and beans. The opinion was held by some observers that any expansion above the indicated practical maximum would involve using land for cotton which could more profitably be used for other crops.

COSTA RICA

Trends In Cotton Production

For many years, the principal export crops of Costa Rica have been coffee and bananas. Cotton has been a relatively unimportant crop, even among those produced for local consumption. Prior to 1937, only experimental plantings were made in various parts of the country, but from 1937 to 1940 some Japanese initiated commercial plantings in Puntarenas and Alajuela Provinces.

After World War II, production was stimulated by attractive prices in international markets and more liberal government credit designed to encourage agricultural diversification. Cotton production increased from around 1,000 bales a year in the early 1950's to a peak of 6,000 bales in

1958-59. The National Production Council had been purchasing about one-third of the crop from growers at an artificially high price of 30 cents a pound regardless of quality, consumption had held at 3,000 bales a year, and a surplus developed. To resolve the problem, a National Cotton Commission was established and exports doubled to 6,000 bales in 1958-59. Since that time production has held at about 5,000 bales a year, consumption has increased, and annual exports have averaged about 2,000 to 3,000 bales.

Production Practices

Most of the farm operations are performed by machine. Some weeding and all harvesting is done by hand. Some growers use such modern techniques as pre-emerge weed killer, while others prepare land, plant, and cultivate by relatively simple methods. Varieties planted include Deltapine 15, Deltapine Smooth Leaf, and Tex Acala. Some planting seed are imported about every 3 years from the United States. Practically all growers use imported commercial fertilizers at present, with applications of around 150 to 200 pounds per acre of high content nutrients such as 10-30-10 or 15-15-15.

In one method of insect control, ground equipment with spray was used for about 60 days, and later when the plants were tall and thick, insecticides were applied by airplanes. Although insecticide companies provide some advice on insect control, a trade source indicated technical assistance is lacking in many phases of cotton production.

Cost of Production

Direct cost of producing cotton average about $95 an acre, and ranges from about $65 in some seasons to $105 in others, according to estimates by local industry sources. Some growers maintain that a yield of about 350 pounds of lint per acre is necessary to cover production costs. The largest of these are for picking and spraying for insects. Harvesting costs about $1.20 per hundredweight, and land rents average about $10 an acre.

Financing and Marketing

A deterrent to expanding cotton production lies in the system of financing and marketing the crop. In 1962-63, the 23 cotton growers financed their production with credit from local banks, principally the National Bank of Costa Rica. Loans cover practically all production costs and interest rates are at 6 percent per annum plus 1 percent for administrative charge. After harvesting and ginning, the grower's cotton is classed then held at the gins until delivered to mills, and the balance may be exported later. After local mill requirements have been established, growers may obtain export permits then sell directly to exporters. The National Production Council regulates the marketing, but does not actually handle or possess the cotton. The mills pay the Council only as the cotton is used, the Council pays the bank, and not until then are production loans finally settled. Thus, cotton is marketed only in a prescribed manner, and growers help finance the cotton until it is used by domestic mills or is exported. The domestic price of cotton is now set early in the season by the Council in consultation with the producers and the two textile mills, taking world prices into account.

Ginning

There are three gins with a total of seven stands located at Barranca, Liberia, and Las Canas. The Las Canas gin was inactive during the 1962-63 season. Gin storage facilities are being enlarged, and present ginning facilities will be used more fully if production expands. Gin outturn is around 36 percent. A lightweight jute bagging is used on bales, and tare is about 15 pounds.

Consumption

The official policy has been to assist the development of the domestic textile industry, presently composed of only two mills. These mills met about 25 percent of domestic textile needs in 1962-63 compared with 15 percent 5 years earlier. Cotton consumption rose from 3,000 bales in the late 1950's to 4,400 bales in 1962-63. It is expected to show further increases unless competition develops from goods produced in neighboring countries under Central American common market arrangements. One mill, which makes work clothes, ticking, and other relatively coarse goods, is being modernized and expanded. The other mill acquired completely new equipment and a modern building in 1954, and is increasing cotton use. About 75 percent of its output consists of sacks and the other 25 percent of poplin, denim, khaki, and heavy cord cloth and other similar materials. Both mills contract for their annual supply of cotton in February and March through the National Production Council on credit, store the cotton in the mill warehouse, and pay the Council as the cotton is actually consumed. Most of the cotton consumption comes from the local crop. However, concern has been expressed by mill interests in importing from the United States some qualities not available locally.

Outlook

The government is aware of difficulties inherent in too much dependence on coffee and bananas and is turning more attention to such crops as cacao, livestock, and cotton. Official plans call for expanding production of these commodities for export purposes. Also, Japanese interests have recently proposed arrangements whereby Japanese credit and technical assistance might be made available to expand cotton production in Costa Rica. The additional cotton presumably would be exported to Japan, to better balance trade between the two countries.

Although the area suitable for cotton production in Costa Rica, as in Honduras, is rather limited, there is land along the Pacific Coast between Jaco and Santa Rosa, and in the Nicoya area that could be used for cotton, possibly 35,000 acres according to some estimates. In 1963-64, there may be an acreage increase from the 5,000 acres planted in 1962-63. Official sources expect production of approximately 20,000 bales within 2 years, compared with 6,000 bales in 1962-63. However, since 1957-58 the National Production Council has discontinued the support price formerly paid to growers to encourage cotton output now that production exceeds domestic use. As a result, other crops such as rice, the price of which is still supported, are relatively attractive.

STATISTICAL APPENDIX

Table 1.--NICARAGUA: Cotton area, yield, and production, seasons beginning August 1, 1940-41 through 1962-63

Season	Area	Yield	Production
	1,000 acres	Pounds per acre	1,000 bales[1]
1940-41............	8	281	5
1941-42............	14	281	8
1942-43............	5	357	4
1943-44............	4	314	3
1944-45............	4	285	3
1945-46............	5	347	4
1946-47............	1	345	1
1947-48............	(2)	--	(3)
1948-49............	7	338	5
1949-50............	37	276	21
1950-51............	41	264	23
1951-52............	86	259	47
1952-53............	64	428	57
1953-54............	100	503	105
1954-55............	214	460	205
1955-56............	257	299	160
1956-57............	182	511	193
1957-58............	218	481	219
1958-59............	223	463	215
1959-60............	164	375	128
1960-61............	151	467	146
1961-62............	185	662	255
1962-63............	220	709	325

[1] Production in bales of 478 pounds net prior to 1946, and 480 pounds thereafter.
[2] Less than 500 acres.
[3] Less than 500 bales.

Table 2.--NICARAGUA: Cotton supply and distribution[1], seasons beginning August 1, 1950-51 through 1962-63

Season	Stocks, Aug. 1	Production	Imports	Total supply	Consumption	Destroyed	Exports	Stocks, July 31	Total distribution
	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]
1950-51..........	6	23	--	29	4	--	24	1	29
1951-52..........	1	47	--	48	3	--	16	29	48
1952-53..........	29	57	--	86	5	--	69	12	86
1953-54..........	12	105	--	117	5	--	102	10	117
1954-55..........	10	205	--	215	5	4	100	106	215
1955-56..........	106	160	--	266	3	1	239	23	266
1956-57..........	23	193	--	216	4	2	150	60	216
1957-58..........	60	219	--	279	4	4	146	125	279
1958-59..........	125	215	--	340	5	2	331	2	340
1959-60..........	2	128	--	130	7	--	115	8	130
1960-61..........	8	146	--	154	7	--	139	8	154
1961-62..........	8	255	--	263	7	2	242	12	263
1962-63..........	12	325	--	337	7	--	315	15	337

[1] Partly estimated.
[2] Bales of 480 pounds net.

Table 3.--NICARAGUA: Cotton exports by country of destination, averages 1940-44 and 1945-49, annual 1950-62

Season[1]	Belgium	Canada	China	France	Germany, West	Guatemala	Italy	Japan	Neth.	Portugal	Sweden	U.K.	U.S.A.	Others	Total
	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]
Average:															
1940-44.......	0	0	(3)	0	1	1	(3)	1	0	0	0	(3)	(3)	1	4
1945-49.......	0	0	0	0	0	1	0	0	0	0	0	(3)	0	(3)	1
Annual:															
1950-51.......	3	(3)	0	1	1	(3)	0	6	2	0	1	5	3	2	24
1951-52.......	2	1	0	2	1	1	3	(3)	3	0	1	2	(3)	0	16
1952-53.......	2	(3)	0	2	30	0	4	11	10	0	4	2	1	3	69
1953-54.......	7	0	0	0	40	0	0	29	10	0	4	12	(3)	0	102
1954-55.......	13	2	0	2	24	0	0	24	23	0	(3)	6	3	3	100
1955-56.......	13	4	1	0	98	0	0	47	49	6	0	17	4	(3)	239
1956-57.......	8	(3)	(3)	22	35	0	1	16	37	0	0	30	(3)	1	150
1957-58.......	4	15	0	12	41	0	5	19	37	0	0	13	0	(3)	146
1958-59.......	7	(3)	5	21	69	0	31	108	51	3	(3)	31	0	5	331
1959-60.......	3	0	1	10	21	0	1	46	11	1	0	19	0	2	115
1960-61.......	1	0	(3)	3	25	0	1	79	9	1	0	14	2	4	139
1961-62.......	4	0	0	12	58	0	5	104	19	11	1	25	0	3	242
1962-63:															
Aug.-Sept...	1	0	0	(3)	3	0	0	5	0	1	0	1	0	0	11

[1] Calendar years before 1950-51, years beginning August 1 thereafter.
[2] Bales of 480 pounds net.
[3] Less than 500 bales.

Table 4.--EL SALVADOR: Cotton area, yield, and production, seasons beginning August 1, 1940-41 through 1962-63

Season	Area	Yield	Production
	1,000 acres	Pounds per acre	1,000 bales[1]
1940-41.............	17	395	14
1941-42.............	9	213	4
1942-43.............	27	249	14
1943-44.............	32	285	19
1944-45.............	31	232	15
1945-46.............	24	220	11
1946-47.............	27	356	20
1947-48.............	39	271	22
1948-49.............	33	320	22
1949-50.............	38	379	30
1950-51.............	48	270	27
1951-52.............	72	280	42
1952-53.............	70	322	47
1953-54.............	52	526	57
1954-55.............	73	592	90
1955-56.............	113	565	133
1956-57.............	95	692	137
1957-58.............	99	800	165
1958-59.............	132	662	182
1959-60.............	95	692	137
1960-61.............	126	701	184
1961-62.............	191	651	259
1962-63.............	220	698	320

[1] Bales of 478 pounds net before 1946 and 480 pounds thereafter.

Table 5.--EL SALVADOR: Cotton supply and distribution, seasons beginning August 1, 1950-51 through 1962-63

Season	Stocks, Aug. 1	Production	Imports	Total supply	Consumption	Destroyed	Exports	Stocks, July 31	Total distribution
	1,000 bales[1]	1,000 bales[1]	1,000 bales[1]	1,000 bales[1]	1,000 bales[1]	1,000 bales[1]	1,000 bales[1]	1,000 bales[1]	1,000 bales[1]
1950-51.........	12	27	--	39	12	--	22	5	39
1951-52.........	5	42	--	47	13	2	10	22	47
1952-53.........	22	47	--	69	13	--	46	10	69
1953-54.........	10	57	--	67	12	--	42	13	67
1954-55.........	13	90	--	103	13	--	35	55	103
1955-56.........	55	133	2	190	13	2	140	35	190
1956-57.........	35	137	7	179	13	--	96	70	179
1957-58.........	70	165	10	245	13	--	127	105	245
1958-59.........	105	182	--	287	15	--	247	25	287
1959-60.........	25	137	--	162	24	--	112	26	162
1960-61.........	26	184	--	210	25	2	138	45	210
1961-62.........	45	259	--	304	28	3	208	65	304
1962-63.........	65	320	--	385	30	5	300	50	385

[1] Bales of 480 pounds net.

Table 6.--EL SALVADOR: Cotton exports by country of destination, averages 1940-44 and 1945-49, annual 1950-62

Season[1]	Belgium	Canada	Costa Rica	France	Germ. West	Guatemala	Honduras	Italy	Japan	Neth.	Panama	U.K.	U.S.A.	Venezuela	Others	Total
	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]
Average:																
1940-44.......	0	(3)	0	0	0	2	(3)	0	0	0	0	0	(3)	0	0	2
1945-49.......	0	0	(3)	0	0	5	1	0	0	0	0	0	0	1	0	7
Annual:																
1950-51.......	3	0	(3)	0	0	4	(3)	0	2	1	4	6	0	0	2	22
1951-52.......	1	0	0	(3)	(3)	(3)	(3)	3	0	2	0	3	0	0	1	10
1952-53.......	4	0	0	(3)	24	0	0	4	1	7	0	4	0	0	2	46
1953-54.......	3	0	0	2	5	0	(3)	(3)	12	1	0	19	0	0	(3)	42
1954-55.......	1	1	(3)	1	3	0	0	0	14	3	(3)	9	2	0	1	35
1955-56.......	1	13	1	2	16	(3)	1	0	80	7	(3)	15	3	0	1	140
1956-57.......	1	3	1	27	4	0	0	0	48	4	(3)	5	3	0	(3)	96
1957-58.......	3	5	(3)	4	15	0	1	3	74	7	(3)	9	4	0	2	127
1958-59.......	5	18	(3)	9	6	0	1	9	173	2	(3)	17	15	0	5	[4]260
1959-60.......	4	0	0	1	3	0	1	1	96	0	0	4	0	0	2	112
1960-61.......	1	0	(3)	(3)	9	0	0	(3)	125	0	0	1	0	0	2	138
1961-62.......	0	0	(3)	2	35	(3)	0	4	159	3	0	1	0	0	4	208
1962-63:																
Aug.-June...	0	0	0	(3)	0	0	0	(3)	39	(3)	0	0	0	0	0	39

[1] Calendar years before 1950, years beginning August 1 thereafter.

[2] Bales of 480 pounds net.

[3] Less than 500 bales.

[4] Includes approximately 13,000 bales of linters.

Table 7.--GUATEMALA: Cotton area, yield, and production, seasons beginning August 1, 1940-41 through 1962-63

Season[1]	Area	Yield	Production[2]
	1,000 acres	Pounds per acre	1,000 bales
1940-41.............	6	239	3
1941-42.............	7	273	4
1942-43.............	7	273	4
1943-44.............	7	137	2
1944-45.............	7	273	4
1945-46.............	7	205	3
1946-47.............	9	266	5
1947-48.............	7	343	5
1948-49.............	8	360	6
1949-50.............	8	300	5
1950-51.............	6	320	4
1951-52.............	20	264	11
1952-53.............	22	349	16
1953-54.............	27	480	27
1954-55.............	39	492	40
1955-56.............	52	406	44
1956-57.............	32	690	46
1957-58.............	43	714	64
1958-59.............	68	529	75
1959-60.............	44	742	68
1960-61.............	64	712	95
1961-62.............	115	605	145
1962-63.............	170	706	250

[1] Partly estimated.

[2] Production in bales of 478 pounds net before 1946, and 480 pounds thereafter.

Table 8.--GUATEMALA: Cotton supply and distribution[1], seasons beginning August 1, 1950-51 through 1962-63

Season	Stocks, Aug. 1	Production	Imports	Total supply	Consumption	Destroyed	Exports	Stocks July 31	Total distribution
	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]
1950-51.........	3	4	6	13	11	--	--	2	13
1951-52.........	2	11	2	15	11	--	--	4	15
1952-53.........	4	16	--	20	11	--	--	9	20
1953-54.........	9	27	--	36	12	--	13	11	36
1954-55.........	11	40	--	51	12	--	30	9	51
1955-56.........	9	44	--	53	12	--	35	6	53
1956-57.........	6	46	--	52	12	--	30	10	52
1957-58.........	10	64	--	74	15	--	45	14	74
1958-59.........	14	75	--	89	13	1	65	10	89
1959-60.........	10	68	--	78	15	--	53	10	78
1960-61.........	10	95	--	105	20	1	75	9	105
1961-62.........	9	145	--	154	25	--	115	14	154
1962-63.........	14	250	--	264	30	--	221	13	264

[1] Partly estimated.

[2] Bales of 480 pounds net.

Table 9.--GUATEMALA: Cotton exports by country of destination, annual 1954-62

Calendar year[1]	Belgium	Canada	France	Germ. W.	Italy	Japan	Neth.	U.K.	U.S.A.	Others	Total
	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]
1954..............	13	0	0	3	0	1	2	4	1	(3)	24
1955..............	6	1	0	6	0	3	6	3	3	2	30
1956..............	1	0	0	23	0	5	3	3	(3)	1	36
1957..............	3	0	11	6	2	2	2	4	(3)	1	31
1958..............	4	0	2	9	2	20	3	3	(3)	1	44
1959..............	(3)	0	1	12	(3)	21	2	6	(3)	2	44
1960..............	(3)	0	1	4	1	42	1	3	0	1	53
1961..............	(3)	0	1	6	(3)	65	1	8	1	1	83
1962..............	1	0	1	14	5	86	3	7	0	[4] 7	124

[1] No exports before 1954.
[2] Bales of 480 pounds net.
[3] Less than 500 bales.
[4] Includes Norway 3, and Portugal 3.

Table 10.--HONDURAS: Cotton area, yield, and production seasons beginning August 1, 1940-41 through 1962-63

Season[1]	Area	Yield[2]	Production[3]
	1,000 acres	Pounds per acre	1,000 bales
1940-41............	1	622	1
1941-42............	1	620	2
1942-43............	2	642	3
1943-44............	2	618	2
1944-45............	1	574	1
1945-46............	1	651	1
1946-47............	1	737	2
1947-48............	2	763	3
1948-49............	2	793	3
1949-50............	2	274	1
1950-51............	3	263	2
1951-52............	4	272	2
1952-53............	4	272	2
1953-54............	4	287	2
1954-55............	5	287	3
1955-56............	6	351	4
1956-57............	13	260	7
1957-58............	24	358	18
1958-59............	20	389	16
1959-60............	5	695	7
1960-61............	5	562	6
1961-62............	12	691	17
1962-63............	16	639	21

[1] Partly estimated.

[2] Calculated before rounding area and production.

[3] Production in bales of 478 pounds net before 1946, and 480 pounds thereafter.

Table 11.--HONDURAS: Cotton supply and distribution[1], seasons beginning August 1, 1955-56 through 1962-63

Season	Stocks, Aug. 1	Production	Imports	Total supply	Consumption	Destroyed	Exports	Stocks, July 31	Total Distribution
	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]
1955-56.........	--	4	2	6	2	--	4	--	6
1956-57.........	--	7	2	9	2	--	6	1	9
1957-58.........	1	18	2	21	2	--	18	1	21
1958-59.........	1	16	1	18	2	--	15	1	18
1959-60.........	1	7	1	9	3	--	5	1	9
1960-61.........	1	6	1	8	3	--	4	1	8
1961-62.........	1	17	--	18	2	--	15	1	18
1962-63.........	1	([2])	--	22	2	--	19	1	22

[1] Partly estimated.

[2] Bales of 480 pounds net.

Table 12.--HONDURAS: Cotton exports by country of destination, annual 1955-1962[1]

Calendar year[1]	El Salvador	Total
	1,000 bales[2]	1,000 bales[2]
1955..................	4	4
1956..................	16	16
1957..................	20	20
1958..................	5	5
1959..................	2	2
1960..................	6	6
1961..................	(3)	[4] 3
1962..................	0	[5] 16

[1] Exports averaged less than 500 bales before 1955.
[2] Bales of 480 pounds net.
[3] Less than 500 bales.
[4] Includes Japan 3.
[5] Includes Belgium 6, and West Germany 8.

TABLE 13.--COSTA RICA: Cotton area, yield, and production, seasons beginning August 1, 1950-51 through 1962-63

Season[1]	Area	Yield[2]	Production[3]
	1,000 acres	Pounds per acre	1,000 bales
1950-51.............	(4)	--	(5)
1951-52.............	1	334	1
1952-53.............	2	347	1
1953-54.............	1	462	1
1954-55.............	1	515	1
1955-56.............	2	375	1
1956-57.............	4	501	4
1957-58.............	5	469	5
1958-59.............	8	349	6
1959-60.............	5	454	5
1960-61.............	4	633	5
1961-62.............	4	728	5
1962-63.............	5	685	6

[1] Acreage and production less than 500 each before 1950-51.
[2] Calculated before rounding area and production.
[3] Production in bales of 478 pounds net before 1946, and 480 pounds thereafter.
[4] Less than 500 acres.
[5] Less than 500 bales.

Table 14.--COSTA RICA: Cotton supply and distribution[1] seasons beginning August 1, 1955-56 through 1962-63

Season	Stocks, Aug. 1	Production	Imports	Total supply	Consumption	Destroyed	Exports	Stocks, July 31	Total distribution
	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]
1955-56.........	--	1	1	2	2	--	--	--	2
1956-57.........	--	4	--	4	2	--	--	2	4
1957-58.........	2	5	--	7	3	--	1	3	7
1958-59.........	3	6	--	9	3	--	6	--	9
1959-60.........	--	5	1	6	3	--	1	2	6
1960-61.........	2	5	1	8	3	--	3	2	8
1961-62.........	2	5	1	8	3	--	3	2	8
1962-63.........	2	6	1	9	4	--	3	2	9

[1] Partly estimated.
[2] Bales of 480 pounds net.

Table 15.--COSTA RICA: Cotton exports by country of destination, annual 1958-61[1]

Country of destination	1958	1959	1960	1961
	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]	1,000 bales[2]
Belgium...........	([3])	0	0	0
Germany, West......	0	1	0	0
Japan.............	1	1	1	3
Netherlands........	0	2	0	([3])
Portugal..........	0	2	0	0
United Kingdom.....	([3])	1	([3])	0
Total........	1	7	1	3

[1] Calendar years.
[2] Bales of 480 pounds net.
[3] Less than 500 bales.

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